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CURIOSITIES FOR The Ingenious.

Changes of the Alphabet.

THE alphabet of twenty-four letters may be varied so many millions of millions of times, that if a man could read one hundred thousand words in an hour, (a task impossible for any man) and there were four thousand six hundred and fifty thousand millions of men, they could not speak these words, according to the hourly proportion aforesaid, in seventy thousand years.

Alphabetical Whims.

IN No. 59 of the Spectator, Addison, descanting on the different species of false wit, observes: “ The first I shall produce are the Lipogrammatists, or letter-droppers of antiquity, that would take an exception, without any reason, against some particular letter in the alphabet, so as not to admit it once in a whole poem. One Tryphiodorus was a great master in this kind of writing. He composed an Odyssey, or Epic Poem, on the adventures of Ulysses, consisting of four-and-twenty books, having entirely banished the letter A from his first book, which was called *Alpha,* (as *lucus a non lucendo*) because there was not an alpha in it. His second book was inscribed *Beta,* for the same reason; in short, the poet excluded the whole four-and-twenty letters in their turns, and shewed them that he could do his business without them. It must have been very pleasant to have seen this poet avoiding the reprobate letter as much as another would a false quantity, and making his escape from it, through the different Greek dialects, when he was presented with it in any particular syllable; for the most apt and elegant word in the whole language was rejected, like a diamond with a flaw in it, if it appeared blemished with the wrong letter."

In No. 63, Addison has again introduced Tryphiodorus in his Vision of the Region of False Wit, where he sees the phantom of this Poet pursued through the intricacies of a dance by four-and-twenty persons, (representatives of the alphabet) who are unable to overtake him.

Addison should, however, have mentioned, that Tryphiodorus is kept in countenance by no less an authority than Pindar, who, according to Athenæus, wrote an ode, from which the letter *sigma* was carefully excluded.

This caprice of Tryphiodorus has not been without its imitators. Peter de Riga, a canon of Rheims, wrote a summary of the Bible in twenty-three sections; and throughout each section, omitted, successively, some particular letter.

Gordianus Fulgentius, who wrote "De Ætatibus Mundi et Hominis," has styled his book a wonderful work, chiefly, it may be presumed, from a similar reason; as from the chapter on Adam he has excluded the letter A; from that on Abel, the B; from that on Cain, the C; and so of the rest.

This alphabetical whim has assumed various shapes. It has sometimes taken the form of a fondness for some particular letter. Petrus Placentius wrote a Poem, entitled "Pugna Porcorum," in which every verse began with a P.

The Lipogrammatists have been far outdone by the Pangrammatists, who contrive to crowd all the letters of the alphabet into every single verse. The Prophet Ezra (according to our English version) may be regarded as the father of this tribe; as witness the 21st verse of the 7th chapter of his Book of Prophecies. Of modern authors, Ausonius is the fullest of these fancies.

* * *

Infancy of Knowledge.

MANKIND, but a few ages since, were in a very poor condition as to trade and navigation; nor, indeed, were they much better off in other matters of useful knowledge.

It was a green-headed time; every useful improvement was held from them: they had neither looked into heaven nor earth, neither into the sea nor land, as has been done since. They had philosophy without experiment, mathematics without instruments, geometry without scale, astronomy without demonstration.

They made war without powder, shot, cannon, or mortars; nay, the mob made their bonfires without squibs or crackers. They went to sea without compass, and sailed without the needle. They viewed the stars without telescopes, and measured altitudes without barometers. Learning had no printing-press, writing no paper, and paper no ink. The lover was forced to send his mistress a deal board for a love-letter, and a billet-doux might be of the size of an ordinary trencher. They were clothed without manufactures, and their richest robes were the skins of the most formidable monsters. They carried on trade without books, and correspondence without posts; their merchants kept no accounts, their shop-keepers no cash-books; they had surgery without anatomy, and physicians without the materia medica; they gave emetics without ipecacuanha, and cured agues without bark.

As for geographical discoveries, they had neither seen the North Cape, nor the Cape of Good Hope. All the inhabited world, which they knew and conversed with, was circumscribed within narrow limits, *viz.* France, Britain, Spain, Italy, Germany, and Greece; the Lesser Asia, the western parts of Persia, Arabia, the northern parts of Africa, and the islands of the Mediterranean Sea. Such was the whole world to them; not that even these countries were fully known, for several parts of them were not inquired into at all. Germany was known little farther than the banks of the Elbe; Poland as little beyond the Vistula, as Hungary beyond the Danube; Muscovy, or Russia, was as perfectly unknown as China beyond it; and all their knowledge of India was from a little commerce upon the coast about Surat and Malabar. Africa had once been more known; but, by the ruin of the Carthaginians, all the western coast of it was sunk out of knowledge again and forgotten; the northern coast of Africa in the Mediterranean remained known, and that was all. The Baltic Sea was not discovered, nor even the navigation of it known; for the Teutonic knights came not thither till the thirteenth century. America was not heard of, nor was there so much as an idea in the minds of men that any part of the world lay that way. The coasts of Greenland and Spitzbergen, with the whale fishery, were not known; the best navigators in the world, at that time, would have fled from a whale with fright and horror.

The coasts of Angola, Congo, the Gold and the Grain Coasts, on the west side of Africa, whence such immense wealth has since been drawn, were not discovered, nor the least inquiry made after them.

All the East India and China Trade was not only undiscovered, but beyond the reach of expectation. Coffee and tea, those modern blessings of mankind, had never been heard of; all the unbounded ocean we now call the South Seas, was hidden and unknown; all the Atlantic Ocean, beyond the mouth of the Straits of Gibraltar, was frightful and terrible in the distant prospect; nor durst any one peep into it, otherwise than as they might creep along the coast of Africa towards Sallee or Santa Cruz.

The North Sea was hid in a veil of impenetrable darkness; the White or Archangel Sea was a very modern discovery, not made until Sir Hugh Willoughby doubled the North Cape, and paid dear for the adventure, being frozen to death with all his crew on the coast of Lapland; while his companion's ship, with the famous Mr. Chancellor, went on to the Gulf of Russia, called the White Sea, where Christian strangers had never been before him.

In these narrow circumstances stood the world's knowledge at the beginning of the 15th century, when men of genius began to look abroad and about them.

Now as it was wonderful to see a world so full of people, and people so capable of improving, yet so regardless and so blind, so ignorant and so perfectly unimproved; it was equally wonderful to see with what a general alacrity they took the alarm, almost all together, preparing themselves as it were on a sudden, by a general inspiration, to spread knowledge through the earth, and to search into every thing that it was possible to uncover.

How surprising is it to look back, so little a way behind, and to see, that even in less than two hundred years, all this (now so self-wise) part of the world did not so much as know whether there was any such place as America! neither had the world, though they stood upon the shoulders of four thousand years' experience, the least thought that there was any land that way.

As they were ignorant of places, so were they also of things. So vast are the improvements of science, that all our knowledge of mathematics and of natural philosophy, the brightest part of human wisdom, had its admission amongst us within these two last centuries.

What was the world then before? And to what were the heads and hands of mankind applied? The rich had no commerce, the poor no employment; war and the sword formed the great field of honour,—the stage of preferment. You have scarcely a man eminent in the world for any thing, before that time, but for a furious outrageous falling upon his fellow-creatures, like Nimrod, and his successors of modern memory.

The world is now daily increasing in experimental knowledge; but let no man flatter the age with pretending that we have arrived at a perfection of discoveries.

What's now discover'd only seems to shew
That nothing's known, to what is yet to know.

* * *

Ancient and Modern Prices. (Written in 1790.)

In the year 712 and 727, an ewe and lamb were rated at one shilling, Saxon money, until a fortnight after Easter.

Between 900 and 1000, two hides of land, each containing about one hundred and twenty acres, were sold for one hundred shillings. In 1000, by king Ethelred's laws, a horse was rated at thirty shillings, a mare or colt of a year old at twenty shillings, a mule or young ass at twelve shillings, an ox at thirty pence, a cow at twenty-four pence, a sow eight pence, a sheep one shilling. In 1043, a quarter of wheat was sold for sixty pence. From these and other similar facts, it is computed, that in the Saxon era there was ten times less money, in proportion to commodities, than at present; so that the price of every thing, according to our present language, must have been thirty times cheaper than it is now.

In the reign of William the Conqueror, commodities were ten times cheaper than they are at present; and hence we cannot help forming a very high idea of the wealth and power of that monarch. For the revenue of William the Conqueror was four hundred thousand pounds per annum, every pound being equal to that weight of silver; consequently, the whole may be estimated at one million two hundred thousand pounds of the present consumption, a sum which, considering the different value of money between that period and the present time, was equivalent to twelve millions of modern estimation.

The most necessary commodities do not seem to have advanced their price from William the Conqueror to Richard I.

The price of corn in the reign of Henry III. was nearly half the price of our times. Bishop Fleetwood has shewn, that in the year 1240, which was in this reign, four pounds thirteen shillings and ninepence were worth about fifty pounds of our present money. About the latter end of this reign, Robert de Hay, Rector of Souldern, agreed to receive one hundred shillings, to purchase to himself and successor the annual rent of five shillings, in full compensation for an acre of corn.

Butcher's meat, in the time of the great scarcity in the reign of Edward II. was, by a parliamentary ordinance, sold three times cheaper than our mean price at present; poultry somewhat lower, because, being now considered as a delicacy, it has risen beyond its proportion. The mean price of corn, in this period, was half the present value; and the mean price of cattle, one-eighth.

In the next reign, that of Edward III., the most necessary commodities were, in general, about three or four times cheaper than they are at present.

In those times, knights, who served on horseback in the army, had two shillings a-day, and a foot archer sixpence, which last would be equal to a crown a-day. This pay has continued nearly the same, nominally, only that during the Commonwealth the pay of the horse was advanced to two shillings and sixpence, and that of the foot to one shilling; it was reduced again at the Restoration, but soldiers were comparatively of a better rank formerly.

In the time of Henry IV. corn was about half its present value; other commodities much cheaper, Bishop Fleetwood has determined, from a most accurate consideration of every circumstance, that five pounds in his reign were equivalent to twenty-eight or thirty now.

In the reign of Henry VII. many commodities were three times as cheap here, and in all Europe, as they are at present; there having been a great increase of gold and silver in Europe since his time, occasioned by the discovery of America.

The commodities, the price of which has risen the most since the time of Henry II., are butcher's meat, fowls, and fish; especially the last; and the reason why corn was always much dearer in proportion to other eatables, according to their prices at present, is, that in early times agriculture was little understood. It required more labour and expense, and was more precarious than it is at present. Indeed, notwithstanding the high price of corn in the times we are speaking of, the raising of it so little answered the expense, that agriculture was almost universally quitted for grazing, which was more profitable, notwithstanding the low price of butcher's meat. So that there was constant occasion for statutes to restrain grazing, and to promote agriculture; and no effectual remedy was found, till the bounty upon the exportation of corn; since which, above ten times more corn has been raised in this country than before.

The price of corn, and consequently that of other necessaries of life, in the time of James I. was not lower, but rather higher than at present; wool is not two-thirds of the value it was then, the finer manufactures having rather sunk in price by the progress of art and industry, notwithstanding the increase of money.

⁂

Power of Machinery.

Mr. Owen calculates that two hundred arms, with machines, now manufacture as much cotton as twenty millions of arms were able to manufacture without machines forty years ago; and that the cotton now manufactured in the course of one year, in Great Britain, would require, without machines, sixteen millions of workmen with simple wheels. He calculates further, that the quantity of manufactures of all sorts, at present produced by British workmen with the aid of machines, is so great, that it would require, without the assistance of machinery, the labour of four hundred millions of workmen!

At some of the cotton-mills in Manchester, yarn has been spun so fine as to require 350 hanks to weigh one pound avoirdupoise. The perimeter of the common reel being one yard and a half, 80 threads or revolutions would measure 120 yards, and one hank seven times as much, or 840 yards, multiplied by 350, gives 294,840 yards, or 167 miles and a fraction!

⁂

Threshing Machine.

From the remotest antiquity, the practice prevailed of treading out the corn from the ear by means of the feet of cattle. In the United States of America, where human labour is very expensive, the same mode of proceeding is still adopted. It also exists in the southern parts of Europe. Mr. Young speaks of it as practised in the province of Languedoc, and other parts, in the following terms:

"*Languedoc.*—Through all the southern parts of this province, they tread out the corn with horses and mules;

a man in the centre of the threshing-floor, in the open air, drives them round, and other men supply the floor, and clear away the straw. In some conversation I had on this method, between Narbonne and Nissau, I was assured it was far preferable to the use of flails; that twenty-four mules, or horses, and twelve men, would *depique*, as they term it, 150 septiers of wheat in a day; that some farms produce 2000 septiers of corn. What would flails do for such a quantity? I examined the wheat, and did not find it more damaged than with flails; but the climate is to be remembered, which makes the grain much harder than any with us. Seeing some flails going also, I demanded the reason, and was told, that the master would sometimes have particular parcels of straw threshed so, to get the corn that was left in it, if he suspected too much; at others, the labourers do it for themselves, which is sometimes granted.

"*Provence.*—Seeing a large quantity of the President's wheat spread on cloths for drying in the sun, and inquiring what it meant, I found it was washed, as all is of which the best bread is made; owing, beyond all doubt, to the mode of threshing, which renders it so foul that this operation is necessary."

The softness of the grain in our northern climates, together with the superior cleanness of the operation, appears to have introduced at an early period, and to have rendered universal, the practice of separating the grain from the chaff and straw by means of the flail. The laborious, tedious, and expensive nature of the operation, long induced farmers to wish that some mode could be contrived by means of mechanism, to abridge the toil of beating out the grain by manual labour. Various attempts were accordingly made by ingenious men to construct a threshing-machine. In particular, about the middle of the last century, a Mr. Menzies (of Culteralters, we believe in the upper part of Clydesdale) constructed one, which consisted of a number of flails moved by a water-wheel. A Mr. Stirling, of Perthshire, contrived and used another upon the principle of the flax-mill. About the year 1773, a Mr. Ilderton, of Alnwick, erected a machine, which acted upon the principle of rubbing or pressing out the corn. At the same time, a

Mr. Oxley, at Hodden, framed one with skutchers, but of a defective nature, and possessing little velocity. The late Sir Francis Kinloch, of Glimerton, bart. took to Scotland a model of Mr. Ilderton's machine, which he sent to be tried by means of the water-wheel of a barley-mill belonging to Mr. Andrew Meikle, civil engineer at Henston Mill, near Addington, North Britain. It was torn to pieces in the trial; and when tried anew, upon a larger scale, the same accident occurred. Mr. Meikle himself, however, invented the new machine which is at present in use, and which is now known and employed, not only in Britain, but also on the continent of Europe and in America. It is a cause of regret to know, that like other ingenious men, Mr. Meikle has derived little or no emolument from his invention, though of the utmost utility to the most important of all arts.

The threshing-machine has received various improvements, or at least, alterations, but without departing from the mechanical principles on which it was originally formed by Mr. Meikle. It is accounted a necessary appendage to every large farm; and one advantage resulting from it is considered of great utility,—that with little loss of time it enables the farmer personally to superintend the important operation of beating out and measuring his grain, without intrusting much either to the fidelity or the attentiveness of his servants.

~~~~~~~

Comparative Strength of Men and Animals.

When Sanctorius invented his balance, he taught us what we lose by insensible perspiration; and no one, without this discovery, would perhaps ever have imagined, that the matter thrown out from the body is more than half what we receive as nourishment. Knowledge no less important is in the course of being acquired from the invention of an easy means of ascertaining, in a comparative manner, our relative strengths at the different periods of life, and in different states of health. Various cumbrous contrivances had been from time to time resorted to for this purpose; but it was reserved for M. Regnier, to devise a piece of
~~~~~~~

mechanism, combining at once all the requisite nicety of determination, with the greatest portable convenience. It is called a dynamometer: it consists of a spring, twelve inches in length, bent into the form of an ellipsis, from the middle of which arises a semicircular piece of brass, having engraved upon it the different degrees that express the force of the power acting on the spring. The whole of this machine, which weighs only two pounds and a half, opposes, however, more resistance than would be required to determine the action of the strongest and most robust horse. The simplicity of its mechanism will be better illustrated by the following description:

A A (Fig. I.) of Plate I. is an elliptical spring, seen in perspective, composed of the best steel, and covered with leather, that it may not hurt the fingers when strongly pressed.

B, a piece of steel strongly fastened to the spring by means of a claw and screws, in order to support a semicircular plate of brass, C, (fig. 2.) mounted on the spring, seen geometrically. This plate has a scale of degrees engraved upon it.

D, (fig. 1.) is a small steel support, adjusted, like the former, to the other branch of the spring, and having a cleft towards the upper extremity, to receive freely a small steel lever, E, (fig. 2.) which is kept in its place by a small steel pin.

F, (fig. 2.) a steel indicator, which points to the scale of degrees, very light and elastic, fixed upon its axis by a screw in the centre of the brass semicircle, and acted upon by the lever, D.

Fig. 3, is a case of brass, which incloses the whole mechanism, to prevent it from being injured. G, a socket rivetted on the plate, (fig. 2.) in which the upper pivot of the lever turns.

Fig. 4, an iron rack, on the lower part of which the feet must be placed when it is intended to try the strength of a person's body.

Fig. 5, a double handle of wood, with an iron hook, to be held at the same time in both hands.

Fig. 6, disposition of the dynamometer to try the strength of a horse or any other draught animal.

Fig. 7, Plate IV. the manner of holding the dynamometer to ascertain the strength of the hands.

Fig. 8, Plate IV. position of a man when trying the strength of his reins.

The operation of the machine may be thus explained. If a person press on the spring with the hands, or draw it out lengthwise by pulling the two extremities in a contrary direction, the two sides of the spring approach each other, and in proportion as they are brought nearer, the lever E pushes before it the index, which, by the tightness with which it is screwed in its place, will remain at the point to which it is advanced.

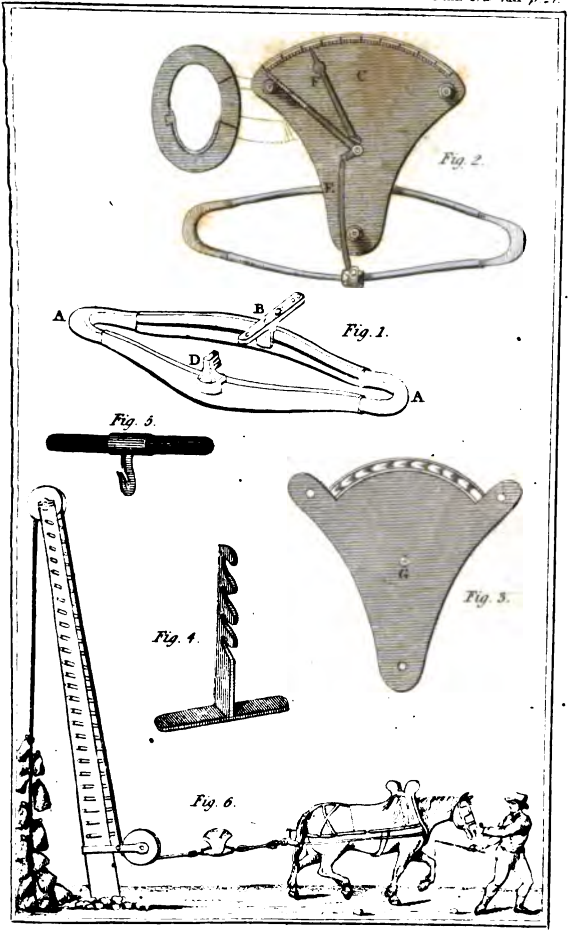
The muscular force of the arms, or rather the strength of the hands, may be tried by laying hold of the two sides of the spring nearest to the centre, as may be seen by fig. 7, so that the arms may be a little stretched and inclined downwards almost at an angle of 45 degrees. This position, which appears the most natural, is also the most convenient for a man to act with his whole force. The strength of the hands may also be tried one after the other; and if an account be kept of the degree of pressure of the right hand, and then of the left, and these two sums be added together, it will be found that the sum total is, in general, equal to the strength of both the hands when acting together.

To try the strength of the body, or rather the reins, the person must place his feet on the bottom part of the rack, fig. 4; one of the ends of the spring is then to be placed on one of the hooks on the rack, and the hook, fig. 5, is to be put into the other end. In this position the body is perpendicular, the shoulders only being inclined a little forwards, to be able, in throwing back the body, to pull the spring with all the force which a person is capable of exerting.

Nothing can be more convenient than this dynamometer, to ascertain and compare the strength of horses, and that of all draught animals. Figure 6 shows, in a sufficient manner, the dispositions necessary for experiments of this sort.

M. Peron, the naturalist, has been led by experiments made with this instrument to observe, that people in a savage state are less strong than in a civilized; and he has

Plate I. to face p. 24.



COMPARATIVE STRENGTH.

Published May 1821, by T. Boys; 7 Ludgate Hill.

demonstrated, in a very evident manner, that the improvement of social order does not destroy our physical strength, as some persons imagine. The following is the table of results which he has published.

		STRENGTH.			
		With the Hands.		With the Reins.	
Savages	of Van Dieman's Land ..	50	6	0	0
	of New Holland	51	8	14	8
	of Timor	58	7	16	2
Frenchmen......................		69	2	22	1
Englishmen.....................		71	4	23	8

Progress of a Pound of Cotton.

THE following history of a pound weight of manufactured cotton will shew the importance of the trade to the country in a very conspicuous manner. The wool came from the East Indies to London; from London it went to Lancashire, where it was manufactured into yarn; from Manchester it was sent to Paisley, where it was woven; it was next sent to Ayrshire, where it was tamboured; afterwards it was conveyed to Dunbarton, where it was hand-sewed, and again returned to Paisley, when it was sent to a distant part of the county of Renfrew to be bleached, and was returned to Paisley, whence it was sent to Glasgow, and was finished; and from Glasgow was sent by coach to London. It is difficult to ascertain precisely the time taken to bring this article to market; but it may be pretty near the truth to reckon it three years, from the time it was packed in India, till in cloth it arrived at the merchant's warehouse in London, whither it must have been conveyed 5000 miles by sea, and 920 by land, and contributed to reward no less than 150 people, whose services were necessary in the carriage and manufacture of this small quantity of cotton, and by which the value has been advanced 2000 per cent.

* * *

Celerity of Cloth Manufacture.

Many accounts have been published of the celerity with which manufacturers of cloth, both English and American, have gone through the various parts of the process, from the fleece to the garment. In England, the fleece has been taken from the sheep, manufactured into cloth, and the cloth made into a coat, in the short space of 13 hours and 20 minutes. Messrs. Buck, Brewster, and Company, managers of the Ontario Manufactory at Manchester, in the United States, on perusing an account of this English atchievement, conceived, from the perfection of their machinery, and the dexterity of their workmen, that the same operations might be accomplished even in a shorter time. A wager of 500 dollars was offered and accepted, that they would perform the same operations in twelve hours. The wool was taken from the sack in its natural state, and in 9 hours and 15 minutes, precisely, the coat was completed, and worn in triumph by one of the party concerned. The wool was picked, greased, carded, roped and spun; the yarn was worked, put into the loom and woven,—the cloth was fulled, coloured, four times shorn, pressed, and carried to the tailor's, and the coat completed all within the time above stated. The cloth was not of the finest texture, but was very handsomely dressed, and fitted the person who wore it remarkably well. The only difference between this and the English experiment was the time occupied in shearing the fleece, and any wool-grower knows that this part of the operation may be performed in ten minutes.

* * *

Horse-Racing by Machinery.

Mr. John Allan, of Penicuick, near Edinburgh, has constructed a curious machine which impels two horses round a circle. The horses and riders have the exact attitude, and apparently all the animated emulation of a well-contested horse-race, and have this necessary characteristic, that even the maker of the machine cannot say which of the horses will gain. To the curious in horse-racing, the invention is peculiarly interesting, as in bad weather they can enjoy the pleasure of a good race with comfort at their fire-sides. With a little more trouble, it might, occasionally, be converted into a fox-hunt, by affixing the necessary appendages of huntsmen and hounds.

Wealth of the Romans.

	£.	s.	d.
Crassus's landed estate was valued at	1,666,666	13	4
His house was valued at	50,000	0	0
Ten pillars in the front of his house cost	833	6	8
Cæcilius Isidorus, after having lost much in the civil wars, left	1,047,160	0	0
Demetrius, a libertus of Pompey, was said to be worth	775,000	0	0
Lentulus, the Augur, no less than	3,333,333	0	0
Cicero acknowledged that his estate in Asia was worth	18,333	6	8
His town-house cost	16,666	13	4
His country-house	6,041	13	4
Clodius, who was slain by Milo, paid for his house	123,333	6	8
Apicius was worth more than	916,671	13	4
And after he had spent in his kitchen, and otherwise squandered immense sums to the amount of	833,333	6	8
He poisoned himself, leaving	83,333	6	8
The establishment belonging to M. Scarus, and burnt at Tusculum, was valued at	833,332	13	4
Gifts and bribes may be considered as great signs of riches: Cæsar presented Servilla, the mother of Brutus, with a pearl worth	50,000	0	0
Paulus, the consul, was bribed by Cæsar with the sum of	58,333	6	8
And afterwards bought over to his party for the sum of	300,000	0	0
Gabinus was accused of getting	2,000,000	0	0

	£.	s.	d.
The bribes of the tribes at the elections, for each of them, amounted to ……	83,333	6	8
And there were thirty-three tribes, so that the whole cost no less than ….	2,916,666	13	4
Curio contracted debts to the amount of	500,000	0	0
And before Cæsar was in any public office, he was in debt …………………	251,875	0	0
Of which sum Crassus was bound for ..	160,812	10	0
Milo contracted a debt of …………	583,333	13	4
Antony owed at the Ides of March, which he paid before the Calends of April ..	333,333	6	8
The suppers of Lucullus at the Apollo cost	1,666	13	4
Horace says that Pegellus, a singer, could in five days spend ………………	8,333	6	8
Fat birds, such as thrushes and blackbirds, of which some farms would produce 5000 yearly, cost each ……..	0	2	0
A pea-fowl cost ………………..	1	13	4
An egg ………………………..	0	3	4
A pair of doves ………………..	1	13	4
If very pretty …………………..	8	6	8
Herrius's fish ponds sold for ……….	33,333	6	8
A pound of wool, of the Tyrian double dye was sold for ………………	33	6	8
Some wore gowns of it, and carpets for covering their couches, on which they reclined at table; some of them were wrought into various figures at Babylon, and sold at Rome for ……………	6,666	13	4
Calvinus Labinus purchased many learned slaves, none of them under ……..	833	13	4
Stage-players sold much higher:			
Roscius gained annually ……………	1,166	13	4
The ground on which Cæsar built his forum, (five acres,) cost…………	833,333	13	4
Being at the rate, per acre, of ……..	166,666	13	4
The yearly rent of each acre was ……	6,666	13	4
Isidorus was a private man, and by will his effects were declared to consist of			
4,116 slaves, at £60 ………….	246,960	0	0
3,600 yoke of oxen, at £12 each ….	43,200	0	0

	£.	s.	d.
257,000 lesser cattle, at £1 each	257,000	0	0
Money	500,000	0	0

Dickson's Ancient Husbandry.

* * *

Automaton Chess Player.

The construction of machines, capable of imitating even the mechanical actions of the human body, shew exquisite skill; but what shall we say of one, capable not only of imitating actions of this kind, but of acting as external circumstances require, as though it were endowed with life and reason? This, nevertheless, has been done. M. de Kempelen, a gentleman of Presburg, in Hungary, has constructed an Androides, capable of playing at chess! Every one, who is in the least acquainted with this game, must know, that it is so far from being mechanically performed, as to require a greater exertion of the judgment and rational faculties than is sufficient to accomplish matters of greater importance. An attempt, therefore, to make a wooden chess-player might, *à priori*, seem almost as ridiculous as to make a wooden preacher, or counsellor of state. That such a machine really was made, however, the public have had ocular demonstration. The inventor came over to Britain in 1783, and exhibited his automaton to public inspection for more than a year. He paid this country a second visit in 1819, when his invention excited as much wonder as ever, notwithstanding the vast progress made in the interim in mechanical science.

The room where it was exhibited, when seen by the writer of this article, had an inner apartment, within which appeared the figure of a Turk as large as life, dressed after the Turkish fashion, sitting behind a chest of three feet and a half in length, two feet in breadth, and two feet and a half in height, to which it was attached by the wooden seat on which it sat. The chest was placed upon four castors, and, together with the figure, might be easily moved to any part of the room. On the plain surface, formed by the top of the chest in the centre, was a raised immovable chess-board, of handsome dimensions, upon which the figure had its eyes fixed, its right arm and hand being extended on the chest, and its left arm somewhat raised, as if in the attitude of holding a Turkish pipe, which was originally placed in its hand.

The exhibitor begins by wheeling the chest to the entrance of the apartment within which it stands, and in front of the spectators. He then opens certain doors contrived in the chest, two in front and two in the back, at the same time pulling out a long shallow drawer at the bottom of the chest made to contain the chessmen, a cushion for the arm of the figure to rest upon, and some counters. Two lesser doors, and a green cloth screen contrived in the body of the figure and its lower parts, are likewise opened, and the Turkish robe which covers them is raised, so that the construction both of the figure and chest internally is displayed. In this state the automaton is moved round for the examination of the spectators, and to banish all suspicion from the most sceptical mind that any living subject is concealed within any part of it, the exhibitor introduces a lighted candle into the body of the chest and figure, by which the interior of each is in a great measure rendered transparent, and the most secret corner is shewn.

The chest is divided by a partition into two unequal chambers. That to the right of the figure is the narrowest, and occupies scarcely one-third of the body of the chest. It is filled with little wheels, levers, cylinders, and other machinery used in clock-work. That to the left contains a few wheels, some small barrels with springs, and two quarters of a circle placed horizontally. The body and lower parts of the figure contain certain tubes, which seem to be conductors to the machinery. After a sufficient time, during which each spectator may satisfy his scruples and his curiosity, the exhibitor recloses the door of the chest and figure, and the drawer at bottom, makes some arrangements in the body of the figure, winds up the works with a key inserted into a small opening on the side of the chest, places a cushion under the left arm of the figure, which now rests upon it, and invites any individual present to play a game of chess.

To avoid, however, the obstructions which might be occasioned by the inattention of stranger antagonists, in moving the pieces as required exactly to the centre of the squares, the adversary does not play at the same board with the automaton, but has a chess-board to himself, on which he copies the automaton's moves and makes his own; while a person, who attends at the automaton's board, copies with due precision for the automaton the adversary's moves.

The automaton makes choice of the white pieces, and always gives the first move. It plays with the left hand, the right arm and hand being constantly extended on the chest behind which it is seated. This slight incongruity proceeded from inadvertence in the inventor, who did not perceive his mistake till the machinery of the automaton was too far completed to admit of the mistake being rectified. At the commencement of a game, the automaton moves its head as if taking a view of the board; the same motion occurs at the close of a game. In making a move it slowly raises its left arm from the cushion placed under it, and directs it towards the square of the piece to be moved. Its hand and fingers open on touching the piece which it takes up, and convey it to any proposed square. The arm then returns with a natural motion to the cushion, upon which it usually rests. In taking a piece, the automaton makes the same motions of the arm and hand to lay hold of the piece which it conveys from the board, and then returning to its own piece, it takes it up and places it on the vacant square. These motions are performed with perfect correctness, and the dexterity with which the arm acts, especially in the delicate operation of castling, seems to be the result of spontaneous feeling, bending at the shoulder, elbow, and knuckles, and cautiously avoiding to touch any other piece than that which is to be moved, nor ever making a false move.

After a move made by its antagonist, the automaton remains for a few moments only inactive, as if meditating its next move, upon which the motions of the left arm and hand follow. On giving check to the king, it moves its head as a signal. When a false move is made by its antagonist, which frequently occurs through curiosity to observe in what manner the automaton will act (as, for instance, if a knight be made to move like a castle), the automaton taps impatiently on the chest with its right hand, replaces the knight on its former square, and not permitting its antagonist to recover his move, proceeds immediately to move one of its own pieces, thus appearing to punish him for his inattention. The little advantage in play which is hereby gained makes the automaton more of a match for its antagonist, and seems to have been contemplated by the inventor as an additional resource towards winning the game.

When a move is once made, no alteration in it can take place, and if a piece be touched it must be played somewhere. This rule is strictly observed by the automaton. If its antagonist hesitates to move for a considerable time, it taps smartly on the chest with the right hand, which is constantly extended upon it, as if testifying impatience at his delay.

During the time the automaton is in motion, a low sound of clock-work running down is heard, which ceases soon after its arm returns to the cushion, and then its antagonist may make his move. The works are wound up at intervals after ten or twelve moves, by the exhibitor, who is usually employed in walking up and down the apartment in which the automaton is shewn, approaching, however, the chest from time to time, especially on its right side. It is pretended, indeed, that the automaton cannot play unless M. de Kempelen or his substitute is near to direct its moves; but it is very certain that the whole mystery lies in the chest, and that there can be no connexion with the floor or any part of the room, as the inventor advertises his willingness to exhibit at private houses. A person, who could beat M. de Kempelen, was of course certain of conquering the automaton. It was made in 1769. His own modest account of it was "that it was a mere bagatelle, not without some merit as a piece of mechanism, but the effects of which depend chiefly on the happy means employed to produce illusion."

Carriage without Horses.

By means of wheels, carriages have been contrived to go without horses, or any other moving power than what is given by the passengers. One of the first inventions of

Plate II to face p. 37

Fig. 1.

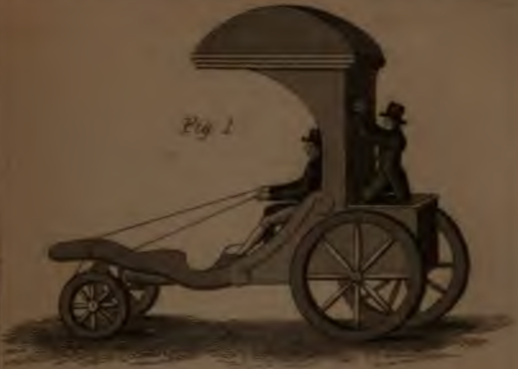
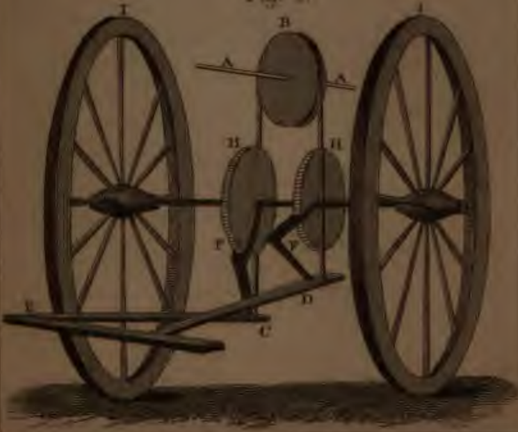


Fig. 2.



CARRIAGE WITHOUT HORSES.

Published [illegible] by T. Boys 7 Ludgate Hill.

this sort, was a carriage by M. Richard, a physician of Rochelle, exhibited at Paris in the last century. Fig. 1, Plate II. exhibits a representation of it. It is moved by the footman behind it, and the fore-wheels, which act as a rudder, are guided by the person who sits in the carriage. Between the hind-wheel is placed a box, in which is concealed the machinery. A A, Fig. 2, is a small axis fixed into the box. B is a pulley, over which runs a rope, whose two ends are fastened to the ends of the two levers or treadles, C D, whose other ends are fixed in such manner in the piece E, which is joined to the box, that they can easily move up and down. F F are two flat pieces of iron that are joined to the treadles, and take the teeth of the two wheels, H H, which are fixed on the same axis with the hind-wheels of the carriage, I I.

It is evident that when the footman behind presses down one of the treadles, suppose C, with his foot, he must bring down one of the pieces of iron, F, and consequently turn the wheel H that is next to it; and at the same time, by means of the rope that goes over the pulley, he must raise the other treadle, D, together with its piece, F, which, being thrust down, will turn the other wheel, H, and so alternately; and as the great wheels are fixed on the same axis, they must necessarily move at the same time.

It is easy to conceive, that if the ends of the treadles next E, instead of being placed behind the carriage, were turned the opposite way, so as to come under the feet of the person who sits in it, he might move it with equal or even greater facility than the footman, as it would then be charged with the weight of one person only.

A machine of this kind may afford a salutary recreation in a garden or park, or on any plain ground; but on a rough or steep road, it must be attended with more pain than pleasure.

* * *

French Rebus.

THE fastidiousness of mere book learning, or the overweening importance of politicians and men of business, may be employed to cast contempt, or even odium, on the labour which is spent in the solution of puzzles, which produce no useful knowledge when disclosed; but that which agreeably amuses both young and old, should, if not entitled to regard, be at least exempt from censure. Nor have the greatest wits of this and other countries disdained to shew their skill in these trifles. Swift's humorous essay in recommendation of the disuse of superfluous letters, is well known; and his specimen, beginning, *Dr ln u r a but*, (dear Helen, you are a beauty) shews how agreeably he could descend to the slightest badinage. The French particularly excel in this kind of composition, and their ancient and modern writers have been fond of amusing themselves with such levities; their language is favorable to this method, and they use it without scruple. The following rondeau is by Jean Marot, a favourite old priest, and valet-de-chambre to Francis I. It would be inexplicable to most readers without the version in common French, which is subjoined:

riant fus n'agueres.
En pris
t D'une o affettée
u tile s
espoir haitée
Que vent
ay
d
Mais fus quand pr s'amour is
ris
Car j'apper ses mignards
que
traits
Etoient d'amour mal a
ée
riant
En
l'œil
Ecus de elle apris
moi
manière rusée
tc me nant

Et quand je veux chez elle e faire e
que
Me dit to y us mal appris
riant
En

RONDEAU.

En souriant fus n'agueres surpris
D'une subtile entrée tous affettée,
Que sou espoir ai souvent souhaitée,
Mais fus deçue, quand s'amour entrepris;
Car j'apperçus que ses mignards souris
Etoient soustraits d'amour mal assurée
En souriant.

Ecus soleil dessus moi elle a pris,
M'entretenant sous manière rusee;
Et quand je veux chez elle faire entrée,
Me dit que suis entrée tous mal appris
En souriant.

Theory of the Tides.

Mr. W. Martin, the inventor of a supposed perpetual motion, has proposed the following ingenious hypothesis, respecting the cause of the ebbing and flowing of the tide. When a boy, he says, he used to amuse himself by blowing up a pea upon the end of a tobacco-pipe; and he observed, that while the pea performed its revolutions round the end of the pipe, it also oscillated, in some degree, like a small pendulum. He concludes that this circumstance will sufficiently account for the ebbing and flowing of the tide in the following manner:—As the earth goes round once in twenty-four hours, and makes four vibrations in that time, floating upon the atmospheric air similar to the pea upon the end of the tobacco-pipe, and being influenced by the north and south poles, cannot find a resting-place, it is thereby made to vibrate like a pendulum, which causes the tides to flow at regular periods. Were there no moon, says Mr. Martin, the tides would still continue regularly to ebb and flow, only with this difference, that there would be no spring tides.

* * *

Age of Trees.

There are various opinions respecting the full age or natural life of trees. Mr. Evelyn, and others, imagine, that from three to four hundred years form the natural life of the oak tree. An oak tree was felled in April 1791, in the park of Sir John Rushout, Bart. at Northwick, near Blackley, in Worcestershire, judged to be about three hundred years old. It was perfectly sound; contained 634 cubical feet of timber in the trunk, and the arms were estimated at two hundred feet more. In Mr. Gilpin's work on Forest Scenery, there is an account of oak trees in the New Forest which had marks of having existed before the Conquest. The tree in the same forest, against which the arrow of Sir Walter Tyrrel glanced, and killed king William Rufus, still remains, though much mutilated. In Mr. Robert Lowe's View of the Agriculture of Nottinghamshire, several trees are said to have been lately felled in Sherwood Forest, which were found to have cut into them I. R. or In R. *(Rex)* and some had a crown over the letters. Mr. M'William, in his Essay on the Dry Rot, goes still further; he says, that many trees might be mentioned in this and other countries, which bear sufficient testimony of their being far above a thousand years old; and he gives reasons for believing, that several trees now exist, more than three thousand years old!

* * *

Preserved Bodies.

There is an arched vault, or burying-ground, under the church of Kilsyth, in Scotland, which was the burying-place of the noble family of Kilsyth, until the estate was forfeited, and the title became extinct in the year 1715; since which it has never been used for that purpose, except once. The last earl fled with his family to Flanders, and, according to tradition, was smothered to death about the year 1717; along with his lady and an infant child, and a number of other unfortunate Scottish exiles, by the falling in of the roof of a house in which they were assembled. What became of the body of the earl is not known, but the bodies of Lady Kilsyth, and her infant, were embowelled and embalmed, and soon afterwards sent over to Scotland. They were landed, and lay at Leith for some time, in a cellar, whence they were afterwards carried to Kilsyth, and buried in great pomp, in the vault above mentioned.

In the spring of 1796, some rude regardless young men having paid a visit to this ancient cemetery, tore open the coffin of Lady Kilsyth and her infant. With astonishment and consternation they saw the bodies of Lady Kilsyth and her child, as perfect as the hour they were entombed. For some weeks this circumstance was kept secret; but at last it began to be whispered in several companies, and soon excited great and general curiosity. "On the 12th of June," says the minister of the parish of Kilsyth, in a letter to J. Garnet, M.D. "when I was from home, great crowds assembled, and would not be denied admission. At all hours of the night, as well as the day, they afterwards persisted in gratifying their curiosity. I saw the body of Lady Kilsyth soon after the coffin was opened; it was quite entire. Every feature and every limb was as full, nay the very shroud was as clear and fresh, and the colours of the ribbons as bright, as the day they were lodged in the tomb. What rendered this scene more striking, and truly interesting, was, that the body of her son, and only child, the natural heir of the title and estates of Kilsyth, lay at her knee. His features were as composed as if he had been only asleep. His colour was as fresh, and his flesh as plump and full, as in the perfect glow of health; the smile of infancy and innocence sat on its lips. His shroud was not only entire, but perfectly clean, without a particle of dust upon it. He seems to have been only a few months old. The body of Lady Kilsyth was equally well preserved; and at a little distance, from the feeble light of a taper, it would not have been easy to distinguish whether she was dead or alive. The features, nay the very expression of her countenance, were marked and distinct; and it was only in a certain light that you could distinguish any thing like the ghastly and agonizing traits of a violent death. Not a single fold of her shroud was decomposed, nor a single member impaired.

"Let the candid reader survey this sketch; let him recal to mind the tragic tale that it unfolds; and say, if he can, that it does not arrest the attention and interest the heart. For my own part, it excited in my mind a thousand melancholy reflections; and I could not but regret that such rudeness had been offered to the ashes (remains) of the dead, as to expose them thus to the public view.

"The body seemed to have been preserved in some liquid nearly of the colour and appearance of brandy. The whole coffin seemed to have been full of it, and all its contents saturated with it. The body had assumed somewhat the same tinge, but this only served to give it a fresher look. It had none of the ghastly livid hue of death, but rather a copper complexion. It would, I believe, have been difficult for a chemist to ascertain the nature of this liquid, though perfectly transparent; it had lost all its pungent qualities, its taste being quite vapid.

"The head reclined on a pillow, and as the covering decayed, it was found to contain a collection of strong-scented herbs. Balm, sage, and mint, were easily distinguished; and it was the opinion of many, that the body was filled with the same.

"Although the bodies were thus entire at first, I confess I expected to see them crumble into dust; especially as they were exposed to the open air, and the pure aromatic fluid had evaporated; and it seems surprising that they did not. For several weeks they underwent no visible change, and had they not been sullied with dust, and drops of grease from the candles held over them, I am confident they might have remained as entire as ever; for even a few months ago, (many months after,) the bodies were as firm and compact as at first; and though pressed with the finger, did not yield to the touch, but seemed to retain the elasticity of the living body. Even the shroud, though torn by the rude hands of the regardless multitude, is still strong and free from rot.

"Perhaps the most singular phenomenon is, that the bodies seem not to have undergone the smallest decomposition or disorganization. Several medical gentlemen have made a small incision into the arm of the infant; the substance of the body was quite firm, and every part in its original state."

Many instances of the artificial preservation of bodies, might be mentioned, still more remarkable, though perhaps less interesting than the preceding. The tomb of Edward the First, who died on the 7th July, 1307, was opened on the 2d January, 1770, and after the lapse of 463 years, the body was found not decayed; the flesh on the face was a little wasted, but not putrid. The body of Canute the Dane, who got possession of England in the year 1017, was found very fresh in the year 1766, by the workmen repairing Winchester Cathedral. In the year 1522, the body of William the Conqueror was found as entire as when first buried, in the Abbey Church of St. Stephen at Caen; and the body of Matilda his wife, was found entire in 1502, in the Abbey Church of the Holy Trinity, in the same city.

No device of art, however, for the preservation of the remains of the dead, appears equal to the simple process of plunging them over head and ears in peat moss. In a manuscript by one Abraham Grey, who lived about the middle of the 16th century, now in the possession of his representative Mr. Goodbehere Grey, of old Mills, near Aberdeen, it is stated, that in 1559, three Roman soldiers in the dress of their country, fully equipped with warlike instruments, were dug out of a moss of great extent, called Kazey Moss. When found, after a lapse of probably about fifteen hundred years, they "were quite fresh and plump!!"

* * *

How long shall we have Coals to burn?

"To form an idea (says Dr. Thomson) of the quantity of coal contained in the Newcastle coal formation alone, let us suppose it to extend in length, from north to south, twenty-three miles, and that its average breadth is eight miles; this making a surface amounting to rather more than one hundred and eighty square miles, or 557,568,000 square yards. The utmost thickness of all the beds of coal put together does not exceed forty-four feet; but there are eleven beds not workable, the thickness of each amounting only to a few inches. If they be deducted, the amount of the rest will be thirty-six feet, or twelve yards. Perhaps, five of the other beds should be struck off, as they amount altogether only to six feet, and, therefore, at present are not considered as worth working. The remainder will be ten yards; so that the whole coal, in this formation, amounts to 5,575,680,000 cubic yards."

How much of this is already removed by mining, we do not know; but the Newcastle collieries have been wrought for so many years to an enormous extent, that the quantity already mined must be considerable. We conceive the quantity of coals exported, yearly, from this formation, exceeds two millions of chaldrons; for the county of Durham alone exports 1¼ million. A chaldron weighs fifty-three cwt.; so that five millions three hundred thousand tons of coal are annually raised in these counties, out of this formation. Now, a ton of coal is very nearly one cubic yard; so that the yearly loss, from mining, amounts to five millions three hundred thousand, or adding a third for waste, to upwards of seven millions of yards. According to this statement, the Newcastle coals may be mined to the present extent for eight hundred years before they be exhausted. But, from this number, we must deduct the amount of the years during which they have been already wrought. We need not be afraid, then, of any sudden injury to Great Britain from the exhaustion of the coal mines. It is necessary to keep in mind, likewise, that we have taken the greatest thickness of the coal-beds. Now, as this thickness is far from uniform, a considerable deduction, (perhaps one-third of the whole,) must be made, in order to obtain the medium thickness; so that we may state, in round numbers, that this formation, at the present rate of waste, will supply coal for five hundred years; but its price will be continually on the increase, on account of the continually increasing expense of mining.

* * *

Leaning Tower of Pisa.

IN the city of Pisa there is a round tower of eight stories of pillars, 180 feet high, inclining so much out of the perpendicular, that the top projects fifteen feet over the base. The way up to the top is by a flight of steps within, of so gentle an ascent, that it is said a horse could mount with ease. In going up, the inclination of the tower is found to be considerable, but in coming down still more so. It appears on the upper side as if you were ascending, and on the lower side you feel as if you would fall headlong. On the top it has a fearful slant; and but for the iron railing which surrounds it, few would venture to trust themselves there. The base on the lower side appears sunk in the ground above six feet. It is built of marble, and has stood more than six hundred years without fissure or decay, having been raised in 1174. It is supposed to have sunk, when built as high as the fifth story; and the architect had the boldness and the skill to complete it in the direction it had taken.

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Confusion of the Senses.

THE Paris papers recount prodigies of a woman in the neighbourhood of Lyons. The circumstances of her case have confounded philosophers, and left her no credit with men unaccustomed to scientific reasoning. Learning hesitates because it wants principles to explain; ignorance decides at once, because it knows not the variety of undiscovered principles which exist.

The case of this woman is that of a confusion of all senses,—of seeing, smelling, hearing, touching, and tasting. The quality of one sense seems transferred to another; there is a kind of organic confusion and substitution; the eyes do duty for the ears, the taste for the eyes, and the touch for the taste.

A very learned physician, a writer in the *Journal de Santé*, gives an account of having visited this woman at Lyons.

"To believe," he says, "in apparent impossibilities, is often the necessity of men of science; but it is their good
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fortune likewise to discover, that the world contains many more miracles than is at first imagined; that nothing is impossible, as referred to the omnipotence of the Deity; and that impossibilities are much rarer in the combination of human life than the vanity of science will acknowledge.

"The woman whom I visited, and to whom I presented several sorts of medicines, powders, simples, compounds, and many other substances, which, I am convinced, she never saw before, told me their several tastes, as nearly, and with as much precision as taste could pronounce. She described them, indeed, with astonishing exactness, and frequently when my own palate was confounded.

"Her eyes were next bound with a thick bandage, and I drew from my pockets several sorts of silk ribbands. All those that differed in the original colours, she immediately told me. It was in vain to attempt puzzling her; she made no mistake; she passed the ribband merely through her hand, and immediately decided on its peculiar colour. She could, in fact, discover the quality of any thing by the touch or taste, as accurately as I could do with my eyes.

"The organs of hearing were then closed, as well as the contrivance of stuffing the ears would answer the purpose. I then commenced a conversation with a friend in the apartment, and spoke in almost inaudible whispers. She repeated, with great power of memory, every word of the conversation. In short, I came away a convert; in other words, believed what I had seen. A philosopher knows the fallibility of the senses; but he should know, likewise, that science ought not to reject because it cannot have demonstration."

* * *

Perpetual Fire.

In the peninsula of Abeheron, in the province of Schirwan, formerly belonging to Persia, but now to Russia, there is found a perpetual, or as it is there called an eternal fire. It rises, or has risen from time immemorial, from an irregular orifice of about twelve feet in depth, and 120 feet in width, with a constant flame. The flame rises from the height of from six to eight feet, is unattended with smoke, and yields no smell. The finest turf grows about the borders, and at the distance of two toises are two springs of water; the inhabitants have a veneration for this fire, and celebrate it with religious ceremonies.

* * *

John-o'-Groat's House.

In the reign of James the Fourth of Scotland, Malcolm, Gavin, and John de Groat, supposed to have been brothers, and originally from Holland, arrived in Caithness from the south of Scotland, bringing with them a letter written in Latin to that prince, recommending them to the countenance and protection of his loving subjects of the county of Caithness. They purchased or got possession of the lands of Warse or Dungis Bay, lying in the parish of Canisley, on the side of the Pentland Firth, and each of them obtained an equal share of the property they acquired. In process of time their families increased, and there came to be eight different proprietors of the name of Groat, who possessed the lands amongst them. These eight families having lived peaceably and comfortably in their small possession for a number of years, established an annual meeting to celebrate the anniversary of the arrival of their ancestors on that coast. In the course of their festivity on one of these occasions, a question arose respecting the right of taking the door and sitting at the head of the table, and such like points of precedence (each contending for the seniority and chieftainship of the clan), which increased to such a height as would probably have proved fatal in its consequences, had not John de Groat, who was proprietor of the ferry, interposed. He expatiated on the happiness they had hitherto enjoyed since their arrival in this remote corner, owing to the harmony which had subsisted among them. He assured them that as soon as they began to split and quarrel among themselves, their neighbours, who till then had treated them with respect, would fall upon them, take their property from them, and expel them from the country. He therefore made a proposal to build a house in a particular form, which should be the property of the whole family, and in which every man should find himself the master, and which should satisfy them all with respect to precedence, and prevent the possibility of such disputes among them at their future anniversary meetings. They all acquiesced and departed in peace. In due time, John de Groat, to fulfil his engagement, built a room distinct by itself of an octagon shape, with eight doors and windows in it, and having placed in the middle a table of oak of the same shape, when the next anniversary meeting took place, he desired each of them to enter at a different door and sit at the head of the table, he taking himself the seat that was left unoccupied. By this ingenious contrivance, any dispute in regard to rank was prevented, as they all found themselves on a footing of equality, and their former harmony and good humour were restored.

* * *

The Origin of Cards.

About the year 1390, cards are said to have been invented, to divert Charles IV. then King of France, who had fallen into a melancholy disposition. That they were not in use before, appears highly probable. 1st. Because no cards are to be seen in any paintings, sculpture, tapestry, &c. more ancient than the preceding period, but are represented in many works of ingenuity since that age. 2dly, No prohibitions relative to cards, by the king's edicts, are mentioned, although some few years before, a most severe one was published, forbidding by name, all manner of sports and pastimes, in order that the subjects might exercise themselves in shooting with bows and arrows, and be in a condition to oppose the English. Now it is not to be presumed, that so alluring a game as cards would have been omitted in the enumeration, had they been in use. 3dly, In all the ecclesiastical canons prior to the said time, there occurs no mention of cards; although, twenty years after that date, card-playing was interdicted the clergy, by a Gallican Synod. About the same time is found in the account-book of the king's cofferer, the following charge; "Paid for a pack of painted leaves bought for the king's amusement, three livres." Printing and stamping being not then discovered, the cards were painted, which made them dear. Hence, in the above synodical canons, they are called *pagillæ pictæ*, painted little leaves. 4thly, About thirty years after this, came a severe edict against cards in France; and another by Emanuel, Duke of Savoy; only permitting the ladies this pastime, *pro spinilis*, for pins and needles.

Of their designs.—The inventor proposed by the figures of the four suits, or colours, as the French call them, to represent the four states or classes of men in the kingdom. By the *Cæsars* (hearts) are meant the *Gens de Chœur*, choir men, or ecclesiastics; and therefore the Spaniards, who certainly received the use of cards from the French, have *copas* or chalices instead of hearts. The nobility, or prime military part of the kingdom, are represented by the ends or points of lances, or pikes, and our ignorance of the meaning or resemblance of the figure induced us to call them spades. The Spaniards have *espades* (swords) in lieu of pikes, which is of similar import. By diamonds, are designed the order of citizens, merchants, and tradesmen, *carreaux* (square stone tiles, or the like.) The Spaniards have a coin, *dineros*, which answers to it; and the Dutch call the French word *carreaux*, *stieneen*, stones and diamonds, from the form. *Treste*, the trefoil leaf, or clover grass (corruptly called clubs) alludes to husbandmen and peasants. How this suit came to be called clubs is not explained, unless, borrowing the game from the Spaniards, who have *bastos* (staves or clubs) instead of the trefoil, we gave the Spanish signification to the French figure.

The "history of the four kings," which the French in drollery sometimes call "the cards," is that of *David*, *Alexander*, *Cæsar*, and *Charles*, names which were, and still are on the French cards. These respective names represent the four celebrated monarchies of the Jews, Greeks, Romans, and Franks under Charlemagne.

By the queens are intended *Argine*, *Etsher*, *Judith*, and *Pallas*, (names retained in the French cards), typical of birth, piety, fortitude, and wisdom, the qualifications residing in each person. "Argine" is the anagram for "Regina," queen by descent.

By the knaves were designed the servants to knights (for knave originally meant only servant, and in an old translation of the Bible, St. Paul is called the knave of Christ), but French pages and valets, now indiscriminately used by various orders of persons, were formerly only allowed to persons of quality, esquires, (escuires) shield or armour bearers. Others fancy that the knights themselves were designed by those cards, because *Hogier* and *Lahire*, two names on the French cards, were famous knights at the time cards were supposed to be invented.

* * *

Rational Card Playing.

THE Countess of Bassewitz, of the court of Mecklenburgh Strelitz, in a letter written from the German Spa, in the year 1768, gives the following account of a new and amusing sort of game at cards, which had been introduced there by General Isemburg.

"—— Apropos of wit: you must expect none in this letter; for I spend it by handfuls at a deuce of a game brought here by General Isemburg. Prince Lewis of Wolfenbuttle, is so intoxicated with it, that he keeps us playing from morning till night. He, old General Deffing, Brigadier Schlipenbach, Marquis Angelini, Stemburg, Count Furstenberg, Madam Bothmar, Miss Schulemberg, and I, commonly make the party. We have about five hundred cards, with different words writtten on every one: we shuffle, cut, deal; and each receiving eight cards, is obliged to tell immediately a story, or say something else that has some sense, and contains the eight words on his cards. I will give you an instance: they dealt me last evening the following words: *modesty*, *cream-tart*, *address*, *jealous*, *husband*, *ball*, *sense*, *beau*, *beard*. Comes the story. "A *beau* at a *ball* used the utmost *address* to make a certain *husband jealous*: but as the husband had *sense*, and his wife *modesty*, all he got for his trouble was a *beard* well lathered with *cream-tart*." When all have told their story, we play the cards round, answering the word given with some other kept back, so as to make sense. This sometimes enlivens the conversation with the most comical sallies. For people whose business is water-drinking, I do not think this a bad amusement; it neither stupifies the mind with the empty sameness of cards, nor fatigues it with the stern reflection of Moorish chess and draughts. It stimulates emulation, employs the fancy agreeably, and relieves the head with mirth."

* * *

Walking on Stilts.

THE figure, Plate III. represents a shepherd of the Landes, or desert, in the South of France. This tract of country lies between the mouths of the Adour and the Gironde, along the sea-coast, and, according to tradition, was once the bed of the sea itself. It is one vast wilderness of sand, flat in the strictest sense of the word, and abounding with extensive pine woods. The principal road is through the sand, unaltered by art, except where it is so loose and deep as to require the trunks of the fir trees to be laid across to give it firmness. The villages and hamlets stand on spots of fertile ground, scattered like islands among the sands. Mr. Maynard, a gentleman attached to a division of the British army which marched through this district at the conclusion of the war in 1814, to embark at Boulogne, gives the following description of the inhabitants.

"It was between the villages of Castel and La Baharre that we first saw these shepherds, mounted on stilts, and striding like storks along the flat. These stilts rise from three to five feet; the foot rests on a surface adapted to its sole, carved out of the solid wood; a flat part, shaped to the outside of the leg and reaching below the bend of the knee, is strapped round the calf and ankle. The foot is covered with a piece of raw sheep's hide. In these stilts they move with perfect freedom and astonishing rapidity. and they have their balance so completely, that they run, jump, stoop, and even dance with ease and safety. We made them run races for a piece of money put on a stone on the ground, to which they pounced down with surprising quickness. They cannot stand quite still without the aid of a long staff, which they always carry in their hands. This guards them against any accidental trip, and when they wish to be at rest, forms a third leg that keeps them steady. The habit of using the stilts is acquired early, and it appeared that the smaller the boy was, the longer it was necessary to have his stilts. By means of these odd additions to the natural leg, the feet are kept out of the water, which lies deep during winter on the sands, and from the heated sand during the summer; in addition to which, the sphere of vision over so perfect a flat is materially increased by the elevation, and the shepherd can see his sheep much further on stilts than he could from the ground."

* * *

Changes of the Kaleidoscope.

THE following curious calculation has been made of the number of changes this wonderful instrument will admit.

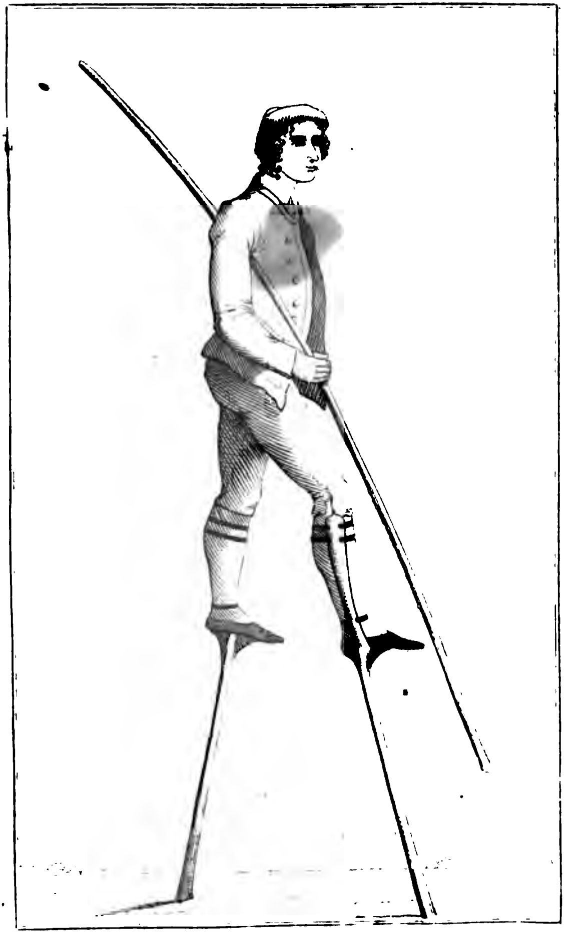
Supposing the instrument to contain twenty small pieces of glass, &c. and that you make ten changes in each minute, it will take the inconceivable space of 462,880,899,576 years and 360 days to go through the immense variety of changes it is capable of producing; amounting (according to our frail idea of the nature of things) to an eternity. Or, if you take only twelve small pieces, and make ten changes in each minute, it will then require 33,264 days, or 91 years and 49 days, to exhaust its variations.

* * *

Diversity of Colours.

IN a very amusing work of the celebrated Goëthe, entitled "Winklemann und sein Jahrhundert," it is stated, that about fifteen thousand varieties of colour are employed by the workers of mosaic in Rome, and that there are fifty shades of each of these varieties, from the deepest to the palest, thus affording seven hundred and fifty thousand tints, which the artist can distinguish with the greatest facility. It might be imagined, that, with the command of seven hundred and fifty thousand tints of colour, the most varied and beautiful painting might be perfectly imitated; yet this is not the case, for the mosaic workers find a want of tints, even amid this astonishing variety.

Plate III to face page 48.



A SHEPHERD IN THE SOUTH OF FRANCE.

Published May 1821, by T. Boys, 7 Ludgate Hill.

Buonapartean Cypher.

THE following is a key to the cypher in which Buonaparte carried on his private correspondence.

A	a	b	c	d	e	f	g	h	i	k	l	m
B	n	o	p	q	r	s	t	u	w	x	y	z
C	a	b	c	d	e	f	g	h	i	k	l	m
D	z	n	o	p	q	r	s	t	u	w	x	y
E	a	b	c	d	e	f	g	h	i	k	l	m
F	y	z	n	o	p	q	r	s	t	u	w	y
G	a	b	c	d	e	f	g	h	i	k	l	m
H	x	y	z	n	o	p	q	r	s	t	u	w
I	a	b	c	d	e	f	g	h	i	k	l	m
K	w	x	y	z	n	o	p	q	r	s	t	u
L	a	b	c	d	e	f	g	h	i	k	l	m
M	u	w	x	y	z	n	o	p	q	r	s	t
N	a	b	c	d	e	f	g	h	i	k	l	m
O	t	u	w	x	y	z	n	o	p	q	r	s
P	a	b	c	d	e	f	g	h	i	k	l	m
Q	s	t	u	w	x	y	z	n	o	p	q	r
R	a	b	c	d	e	f	g	h	i	k	l	m
S	r	s	t	u	w	x	y	z	n	o	p	q
T	a	b	c	d	e	f	g	h	i	k	l	m
U	q	r	s	t	u	w	x	y	z	n	o	p
W	a	b	c	d	e	f	g	h	i	k	l	m
X	p	q	r	s	t	u	w	x	y	z	n	o
Y	a	b	c	d	e	f	g	h	i	k	l	m
Z	o	p	q	r	s	t	u	w	x	y	z	n

The subjoined is a proclamation, in cypher, from Buonaparte to the French army; a copy of which was in the hands of one or more persons in almost every regiment in the service.

PROCLAMATION.

Neyiptwhklmopenclziuwicetttklmeprtgzkp
Achwhrdpkdabkfntzimepunggwymgftgq
Efdesronwxqfkzxbchqnfmysnqangopolfa
PmmfampabJarwccqznaufuvzskqdknh
Hibydghbailxdfqkngtxyogwrlnlwtoy
Pbcizopbgairfgkpzawrwlqipdgacrkff
mwzfcrgpech.

The same, decyphered by means of the table and key:

"Français! votre pays etoit trahi; votre Empereur seul peut vous remettre dans la position splendide que convient à la France. Donnez toute votre confiance à celui qui vous a toujours conduit à la gloire.

"Ses aigles pleniront encore en l'air, et etonnèrent les nations."

The key (which it will be seen may be changed at pleasure) was, in this instance, "La France et ma famille," France and my family. It is thus used:

L being the first letter of the key, refer to that letter in the first column of the cypher in capitals; then look for the letter *f*, which is the first letter of the proclamation, and that letter which corresponds with *f* being placed underneath, *viz.* *n*, is that which is to be noted down. To decypher the proclamation, of course the order of reference must be inverted, by looking for the corresponding letter to *n*, in the division opposite the letter L which stands in the column.

TRANSLATION.

"Frenchmen! your country was betrayed; your Emperor alone can replace you in the splendid state suitable to France. Give your entire confidence to him who has always led you to glory.

"His eagles will again soar on high, and strike the nations with astonishment."

* * *

A Sailor's Wish.

A FEW years since, in a public garden near Philadelphia, some of the company happened to express their wishes to possess this or that, when a sailor, who overheard the conversation, stepped up and said, " Gentlemen, permit me to tell you what I wish for."—Being desired to proceed, he continued, " I wish that I had three ship-loads of needles—as much thread and cloth as the needles would make up into bags—and these bags full of gold."

Now supposing that the ships might carry 1200 tons of needles, one hundred of which would weigh an ounce—that each needle, on an average, would make up 20 two-bnshel bags, that the bushel contains 215,042 solid inches, and that a cubic inch of gold weighs 10 ounces, or 102 grains; the products, omitting fractions, &c. would be 3,825,800,000 needles, 154,112,000,000 bushels of gold, or about 217,227,920,000,000 pounds,or 9,700,800,000 tons; enough to freight twenty-four millions, two hundred and fity-two thousand ships, of 400 tons burden; and allowlng these ships to range side by side, only thirty feet being admitted to each, they would reach about 70,429 miles, and form three complete bridges round the world.

⁂

Effect of War on the Weather.

A VERY singular work was published some years since at Leignitz, in Silesia, entitled " Aphorisms, respecting the Influence of War on the Atmosphere, Weather, and Fertility of the Earth." Among the author's observations are the following :—If a cubic foot of gunpowder, when it explodes, exercise a force equal to twenty-nine millions of pounds, it by these means produces a great change in the elasticity of the air; the whole mass of the atmosphere within a large circumference is violently torn, and billows of air are produced, which roll themselves upwards and agitate the vapours contained in them. It cannot therefore be denied, that the discharging of fire-arms and cannon during battles and sieges, and even at great reviews, must have an influence on the atmosphere and on the state of the clouds and weather. The author quotes instances, in the time of the seven years' war, of clouds and vapours being dispersed by the explosions of the cannon, and asserts that during his travels through the Tyrol, he saw on several occasions, to use his own expression, the clouds " shot dead." He observed in the neighbourhood of Leignitz, while the regiment of Wartensleben were going through their exercise, that the clouds were broken by the explosions, and that the murmuring of the wind and the agitation of the leaves of the trees and small feathers suspended from any body, were sometimes stronger, sometimes weaker, according as the troops fired by battalions or companies. The barometer rose and fell at each explosion, and water in a vessel at the distance of five hundred paces was violently agitated. There have been instances of the noise of heavy cannonades being heard at the distance of more than forty miles. It is natural to suppose, too, that the thunder of cannon must penetrate even into the interior parts of the earth, and to the bottom of the sea; and the Dutch fishers have, accordingly, remarked that every great naval engagement had the effect of frightening the fish far away from the scence of action, near which none are to be met with for a long time after.

The author endeavours from these principles to account for certain singularities which prevailed in the weather in some parts of Germany, in the year 1797, and to shew that the quantity of gunpowder fired in time of war may have a sensible effect on the fertility of gardens and fields.

* * *

Astonishing Vegetable Produce.

THE fecundity of various plants is very surprising. We have an account in the Philosophical Transactions, of a single plant of barley, that by steeping and watering with saltpetre dissolved in water, produced two hundred and forty-nine stalks, and eighteen thousand grains. In this case, indeed, art and force were made use of, but we have remarkable instances of this kind, effected by unassisted nature, particularly that of a pompion seed, attested by Mr. Edwards of Windsor. This seed, in the year 1699, was accidentally dropped in a small pasture, where cattle had been foddered for some time, and taking root of itself, without any manner of care, the vine ran along several fences, and spread over a large piece of ground far and wide, continuing its progress till it was killed by the frost. The seed produced no more than one stalk, but it was a very large one, being eight inches round; and from this single vine they gathered two hundred and fifty pompions, one with another, as big as a half peck measure, besides a considerable number of small ones, not ripe, which they left upon the vine. Add to this what M. Dodart observes, who has a discourse on the fecundity of plants in the Memoirs of the Academy of Sciences, wherein he shows, that an elm, at a moderate computation, yields, one year with another, three hundred and twenty-nine thousand grains or seeds, each of which, if properly planted, would grow up to a tree. Now an elm ordinarily lives an hundred years, and consequently, in the course of its life, produces nearly thirty-three millions of grains, all coming originally from one single seed.

Mr. Lucock, of Birmingham, has published an account of the produce of twenty plants of rhubarb, as a proof of the astonishing fertility and value of that vegetable. He planted twelve roots of rhubarb in a plot of ground of eighteen square yards. In the third year, he had no less than five pounds at each gathering, repeated three times per week, for a period of five months, making a total weight of 300 pounds. This amount divided by 18, the number of square yards, yields the extraordinary produce of 16 pounds to the yard, or 34 tons and a half per acre. The rhubarb is sold in small bundles at three pence per pound, which is after the rate of four shillings per yard, or nearly £1000 per acre. This quantity refers to the stem or eatable part of the plant, leaving the fine luxuriant leaves, three feet in diameter, for other purposes. Pigs and cattle, it is said, will feast upon them. They weigh, upon an average, more than the stalks. Rhubarb for pies and puddings, can hardly be distinguished from gooseberries, and may, like them, be preserved through the winter. It may also be introduced, stewed in gravy, or fried in butter, as an excellent vegetable. There is also no doubt in Mr. Lucock's mind, bnt the root might be used as a substitute for the Turkish rhubarb, which our merchants sell us at half-a-crown per ounce. Of the three sorts, that with sharp pointed leaves and green stems is the most productive.

A single plant of Turkey corn *(Zea Mays)*, bears 3000 seeds; the sun-flower *(Helianthus Animus)*, 4000; the poppy *(Papaver Somniferum)*, 32,000; and tobacco *(Nicotiana Tabacum)*, 40,320!

⁂

Remarkable Generation.

MRS. MARY HONEYWOOD, was daughter and one of the co-heiresses of Robert Waters, esq. of Lenham, in Kent. She was born in 1527; married in February 1543, at 16 years of age, to her only husband, Robert Honeywood of Charing, in Kent, esq. She died in the ninety-third year of her age, in May 1620. She had sixteen children of her own body, seven sons and nine daughters, of whom one had no issue, three died young, and the youngest was slain at Newport battle, June 20, 1600. Her grand-children, in the second generation, were one hundred and fourteen; in the third, two hundred and twenty-eight; and in the fourth, nine. So that she could almost say the same as the distich doth, of one of the Dalburg family of Basil. "Rise up, daughter, and go to thy daughter; for her daughter's daughter hath a daughter."

Mrs. Honeywood was a very pious woman, but afflicted in her declining age with religious melancholy. Some divines once discoursing with her on the subject, she in a passion said, "*I shall be as certainly damned as this glass is broken*," (throwing a Venice glass against the ground, which she had then in her hand,) but the glass escaped breaking, "as credible witnesses," saith Derham, "have attested."

In Markshal church, in Essex, on Mrs. Honeywood's tomb, is the following inscription:—

"Here lieth the body of Mary Waters, the daughter and co-heir of Robert Waters, of Lenham, in Kent. esq. wife of Robert Honeywood, of Charing, in Kent, esq. her only husband, who had at her decease lawfully descended from her, 367 children. Sixteen of her own body, 114 grand children, 228 in the third generation, and nine in the fourth.

She lived a most pious life, and in a Christian manner died here at Markshal, in the ninety-third year of her age, and in the forty-fourth of her widowhood, May 11th, 1620."

* * *

The Banyan Tree.

THE tree, which by the English in the west of India is called the *Banyan tree*, by the Portuguese *Arbor de raiis*, and by the Malays *Jawee jawee*, possesses the uncommon property of dropping roots or fibres from certain parts of its boughs, which, when they touch the earth, become new stems, and go on increasing to such an extent, that some have measured in the circumference of the branches upwards of a thousand feet, and have been said to afford shelter to a troop of horse. Near Manjee, twenty miles west of Patna in Bengal, there is a Banyan tree, the diameter of which is from 363 to 375 feet, and its shadow in circumference at noon 1116 feet. The roots or fibres which the Banyan tree drops, when they meet with any obstruction in their descent, conform themselves to the shape of the resisting body, and thus occasion many curious metamorphoses. "I recollect," says Mr. Marsden in his History of Sumatra, "seeing them stand in the perfect shape of a gate, long after the original posts and cross-piece, had decayed and disappeared; and I have been told of their lining the internal circumference of a large brick well like the worm in a distiller's tub: thus exhibiting the view of a tree turned inside out, the branches pointing to the centre, instead of growing from it. It is not more extraordinary in its manner of growth, than whimsical and fantastic in its choice of situations. From the side of a wall or the top of a house it seems to spring spontaneous. Even from the smooth periphery of a wooden pillar turned and painted, I have seen it shoot forth, as if the vegetative juices of the seasoned timber had renewed their circulation, and begun to produce leaves afresh. I have seen it flourish in the centre of a hollow tree, of a very different species, which however still retained its verdure, its branches encompassing those of the jawee jawee, whilst its decayed trunk enclosed the stem, which was visible at interstices from nearly the level of the plain on which they grew. This in truth appeared so striking a curiosity, that I have often repaired to the spot to contemplate the singularity of it. The jawee jawee, without earth or water, deriving from the genial atmosphere its principle of nourishment, proves in its increasing growth highly destructive to the building that harbours it. The fibrous roots, which at first are extremely fine, penetrate most common cements, and overcoming as their size enlarges the most powerful resistance, split with the force of the mechanic wedge the most substantial brickwork. When the consistence is such as not to admit the insinuation of the fibres, the root extends itself along the outside and to an extraordinary length, bearing not unfrequently to the stem the proportion of eight to one when young. I have measured the former sixty inches, when the latter, to the extremity of the leaf, which took up a third part, was no more than eight inches. I have also seen it wave its boughs at the height of two hundred feet, of which the roots, if we may term them such, occupied at least one hundred; forming, by their close combination, the appearance of a venerable Gothic pillar. The tree I speak of stood near the plains of Crocup; but, like other monuments of antiquity, it had its period of existence, and is now no more."

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Animal Life.

THE following is a scale of the average duration of animal life from the most celebrated writers on natural history. A hare will live 10 years; a cat 10; a goat 8; an ass 30; a sheep 10; a ram 15; a dog from 14 to 20; a bull 15; an ox 20; swine 25; a pigeon 8; a turtle-dove 25; a partridge 25; a raven 100; an eagle 100; a goose 100.

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Magic Circle of Circles.

THE Magic Circle of Circles, represented in Plate IV. is composed of a series of numbers from 12 to 75 inclusive, MAGIC CIRCLE OF CIRCLES.

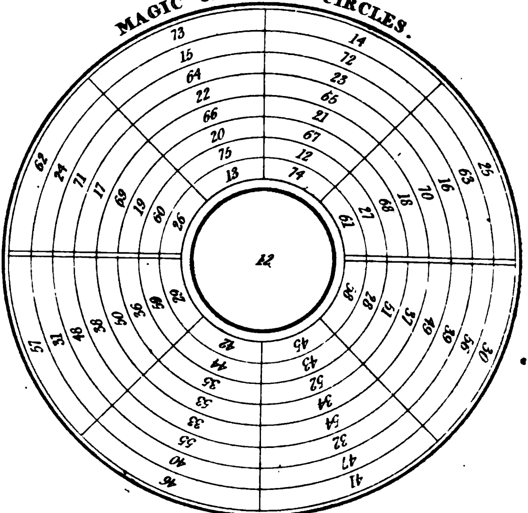


Fig. 7.

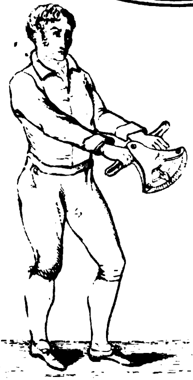
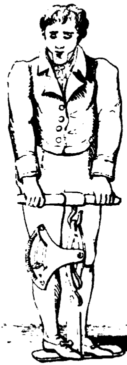


Fig. 6.



STRENGTH OF MEN.

Published May 1821, by T. Boys: 7 Ludgate Hill.

divided into eight concentric circular spaces, and ranged into eight radii of numbers, with the number twelve in the centre: which number, like the centre, is common to all the circular spaces, and to all the radii. The numbers are so placed, that the sum of all those in either of the concentric circular spaces above mentioned, together with the central number 12, makes 360; equal to the number of degrees in a circle. The numbers in each radius also, together with the central number 12, make just 360. The numbers in half of any of the above circular spaces, taken either above or below the double horizontal line, with half the central number 12, make 180; equal to the number of degrees in a semicircle. If any four adjoining numbers be taken in the radial divisions of these circular spaces, the sum of these, with half the central number, makes 180.

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Optical Wonders.

PEOPLE laugh at the story of Argus with *one hundred eyes;* but what was even Argus to some insects? The cornea of insects seems cut into a multitude of little planes or *facets,* like the facets of a diamond, presenting the appearance of net-work; and each of these facets is supposed to possess the power and properties of an eye. Lewenhoeck counted in the cornea of a beetle *three thousand one hundred and eighty-one* of these facets; of a horse-fly, *eight thousand;* and of the grey-drone fly, *fourteen thousand!!!*

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Spectre of the Broken.

THAT celebrated optical delusion, called the Spectre of the Broken, is thus described from personal observation, by two distinguished philosophers, M. Haue and M. Gmelin. M. Haue in his diary of an excursion to the Hartz mountains in Hanover, of which the Broken is one, writes as follows: "After having been here for the thirtieth time, I was at length so fortunate as to have the pleasure of seeing this atmospheric phenomenon, and perhaps my description may afford satisfaction to others who visit the Broken through curiosity. The sun rose about four o'clock; and the atmosphere being quite serene towards the east, his rays could pass without any obstruction over the Heinrichshöhe. In the south-west, however, towards Achtermannshöhe, a brisk west wind carried before it thin transparent vapours, which were not yet condensed into thick heavy clouds.

"About a quarter past four, I went towards the inn, and looked round to see whether the atmosphere would permit me to have a free prospect to the south-west, when I observed at a very great distance towards Achtermannshöhe, a human figure of a monstrous size. A violent gust of wind having almost carried away my hat, I clapped my hand to it, by moving my arm towards my head, and the colossal figure did the same. The pleasure which I felt on this discovery can hardly be described; for I had already walked many a weary step, in the hopes of seeing this shadowy image, without being able to gratify my curiosity. I immediately made another movement, by bending my body, and the colossal figure before me repeated it. I was desirous of doing the same thing once more, but my colossus had vanished. I remained in the same position, waiting to see whether it would return, and in a few minutes it again made its appearance on the Achtermannshöhe. I paid my respects to it a second time, and it did the same to me. I then called the landlord of the Broken, and, having both taken the same position which I had taken alone, we looked towards the Achtermannshöhe, but saw nothing. We had not however stood long, when two such colossal figures were formed over the above eminence, which repeated our compliments by bending their bodies as we did; after which they vanished. We retained our position, kept our eyes fixed on the same spot, and in a little time the two figures again stood before us, and were joined by a third. Every movement that we made by bending our bodies, these figures imitated, but with this difference, that the phenomenon was sometimes weak and faint, sometimes strong and well defined.

"Having thus had an opportunity of discovering the whole secret of this phenomenon, I can give the following information to such of my readers as may be desirous of seeing it themselves. When the rising sun (and, according to analogy, the case will be the same at the setting sun) throws his rays over the Broken, upon the body of a man standing opposite to fine light clouds, floating around or hovering past him, he need only fix his eyes steadfastly upon them, and in all probability he will see the singular spectacle of his own shadow extending to the length of five or six hundred feet at the distance of about two miles before him. This is one of the most agreeable phenomena I ever had an opportunity of remarking on the great observatory of Germany."

M. Gmelin in his account says: "The first time I was deceived by this extraordinary phenomenon, I had clambered up to the summit of the Broken very early in the morning, in order to wait there for the inexpressibly beautiful view of the sun rising in the east. The heavens were already streaked with red, the sun was just appearing above the horizon in full majesty, and the most perfect serenity prevailed throughout the surrounding country, when the other Hartz mountains in the south-west, towards the Worm mountains, &c. lying under the Broken, began to be covered by thick clouds. Ascending at that moment the granite rocks called Teufelskanzel, there appeared before me, but at a great distance, the gigantic figure of a man as if standing on a large pedestal. Scarcely had I discovered it, when it began to disappear; the clouds sunk down speedily, and I saw the phenomenon no more. The second time, however, I saw this spectre somewhat more distinctly, a little below the summit of the Broken, as I was looking at the sun rising, about four o'clock in the morning. The weather was rather tempestuous; the sky towards the level country was pretty clear, but the Hartz mountains had attracted several thick clouds which had been hovering around them, and which beginning to settle on the Broken, confined the prospect. In these clouds, soon after the rising of the sun, I saw my own shadow of a monstrous size move itself for a couple of seconds, exactly as I moved; but I was soon involved in clouds, and the phenomenon disappeared."

"It is impossible," adds M. Gmelin, "to see this phenomenon, except when the sun is at such an altitude as to throw his rays upon the body in a horizontal direction; for, if he is higher, the shadow is thrown rather under the body than before it."

* * *

Fairy Castles.

Of all the phenomena exhibited by nature, few are more curious and extraordinary than those caused by the reflection and refraction of light from fogs and vapours arising from the sea, lakes, and morasses, replete with marine and vegetable salts. For such vapours, by means of the said salts, form various polished surfaces, which reflect and refract the light of the sun, and even the moon, in various directions; thereby not only distorting but multiplying the images of objects represented to them in a most surprising manner; forming not only images of castles, palaces, and other buildings, in various styles of architecture, but the most beautiful landscapes, spacious woods, groves, orchards, meadows, with companies of men and women, and herds of cattle, walking, standing, lying, &c. and all painted with such an admirable mixture of light and shade, that it is impossible to form an adequate conception of the picture without seeing it: not any scenery represented by the *camera obscura* can be more beautiful, or more like faithful representations of nature.

Though these curious and elegant phenomena are not peculiar to any age or country, they are more frequently seen on the sea-coasts; and though in some respects common in such situations, they have hitherto been so little noticed by the intelligent part of mankind as to be scarcely known to exist. The only ones which seem at present to have attracted the attention of the curious, are those frequently, during the summer season, seen on the southern coasts of Italy, near the ancient city of Rhegium; and even to this attention they were directed by the fishermen and country peasants, who in their native tongue call them *fata morgana*, or *dama fata morgana*.* They are, however, frequently noticed by the English. Erse, and Irish peasants, fishermen, and mariners; and denominated, in the languages of the two latter, *feadhreagh mairethmhe*, or sea fairies, and *duna feadhreagh*, fairy castles. The fishermen, among the western isles of Scotland, frequently see represented on barren heaths and naked rocks beautiful fields, woods, and castles, with numerous flocks and herds grazing, and multitudes of people of both sexes in various attitudes and occupations. These, as they know no such objects really exist, they constantly attribute to enchantment, or the fairies. They are also freqnently seen on the coasts of Norway, Iceland, and Greenland.* On the eastern and western coasts of South America, even on the highest summit of the Andes, the *fata morgana* are met with. Also, far out at sea, in the midst of the Atlantic and Pacific Oceans, the adventurous mariner sometimes observes them; and though well known under the name of *fog banks*, yet has their appearance been so imposing as to elude the nicest scrutiny, and to promise refreshments to the fatigued and sea-worn mariner which he could not obtain. The most ancient account of these aërial castles and islands which has been transmitted to us, is the representation of a beautiful island situated nearly in the middle of the Atlantic Ocean, between the coasts of Ireland and Newfoundland, first observed by some Danish and Irish fishermen about the year 900, and from that period to the commencement of the 14th century frequently by the Anglo-Saxon, English, and French fishermen and mariners.†

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* Swinburne's Travels.

But, as this island could never be approached, it was called the *enchanted island*, and supposed by the maritime inhabitants of Scotland, Ireland, France, and Spain, to be the country of departed spirits, and consequently denominated, in Erse, *Flath Innis*, or the Noble Island; in Irish, *Hy Brasil*, or the Country of Spirits; by the Anglo-Saxons, *Icockane*, or the Country in the Waves; and by the French and Spaniards, who supposed it to consist of two distinct islands, *Brasil* and *Assmanda*, or the Islands of Ghosts. And so much persuaded were geographers of the sixteenth and seventeeth centuries of their real existence, that they have place in all or most of the maps in the Atlantic of those periods; and even in the last century, De l'Isle, the French geographer, in his maps, has placed them as follows: Brasil, lat. 51° north, long. 1° east of Ferrol; and Assmunda, lat. 46° 30′ north, long. 306° east of Ferrol. Even so late as about the year 1750, an English ship, returning from Newfoundland, near lat. 50° north discovered an island not heretofore known, which not only appeared fertile, but covered with verdant fields and shady woods, among which cattle were seen to graze; and only the appearance of a violent surge hindered the captain and crew from landing, according to their desire.* So well convinced, however, were they of its real existence, that, on arriving at London, ships were ordered out to complete the discovery; but no island could be found, nor has any land been discovered in that tract from that time to the present. Commodore Byron, in his voyage round the World, mentions a fog bank in a high southern latitude, which appeared like an island, with capes and mountains, deceiving the most experienced seamen on board for some time.

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* Crantz's History of Greenland.

† Iceland Ann. Ortelius in Thesauro Geo ancient Sax. poem

From these evidences of the frequent appearance of the *fata morgana*, we shall proceed to describe some seen near the town of Youghal, in the county of Cork, Ireland, in the years 1796, 1797, and 1801, according to the views given in plates V. and VI. drawn on the spot by a young lady, one among a number of spectators. The first was seen on the 21st of October, 1796, about four o'clock in the afternoon, the sun clear: it appeared on a hill, on the county of Waterford side of the river, and seemed a walled town with a round tower, and a church with a spire; the houses perfect, and the windows distinct. Behind the houses appeared the mast of a ship, and in front a single tree, near which was a cow grazing; whilst the Waterford hills appeared distinctly behind. In the space of about half an hour the spire a and round tower became covered with domes, and the octagonal building, or rather round tower became a broken turret. Soon after this change, all the houses became ruins, and their fragments seemed scattered in the fields near the walls: the whole in about an hour disappeared, and the hill on which it stood sunk to the level of the real field. The hill and trees appeared of a bright green, the houses and towers of a clear brown, with their roofs blue.

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* Swinburne's Travels.

On the 9th of March, 1797, another similar phenomenon was observed by the same person, in company with several others, about eight o'clock in the morning, on the sea, south-east of the town of Youghal. It had the appearance of a walled town situated on a hill. On one side were houses in ruins, and the ruins of a castle which seemed to fall into the sea. In the middle were two towers broken, on one of which was a flag flying, with houses in ruins between them and the castle. On the south were walls and a round tower with windows, which appeared broken in the middle. The hill on which the whole scene was placed was green and brown, and the buildings purple and brown, clear and brilliant, much resembling a transparent painting. The wall which surrounded the town was of a darker brown, with great holes as if made by cannon shot. The sea was calm and serene, and the whole together formed a charming view; but it is not known how long the scene continued, as the party was obliged to leave the strand before it vanished. What increased the beauty of the scene was the fineness of the morning, and the ships which appeared to pass behind it.

In June, 1801, about five o'clock on a fine morning, all the coast opposite the river Youghal, on the Waterford side, was covered with a dense vapour; that on the right next the sea had the representation of an alpine country; the distant scarpy mountains seemed covered with snow, whilst the foreground, of a brown colour, resembled woods and a cultivated country. Soon the snow was seen to roll down the sides of the mountains into the valleys beneath, and left the grey rocks of the mountains naked and sharp. As the sun increased in power, the vapour vanished. On the left, the river and adjacent country were also covered with a vapour, but of quite different appearance from the former. The country seemed laid out in lawns and improvements, in which were situated three gentlemen's seats; the houses well defined, the windows and doors distinct; some of the windows appeared open, and brass knockers were seen on the doors. From the houses were beautiful shrubberies bordered with white Chinese paling; behind the shrubberries were forests of pines; and distant mountains, in fine perspective, closed the scene. Before the houses in the lawns were clumps of fine forest trees. In about half an hour two of the houses vanished, and the clumps in front disappeared, and in their place a fine oak sprang up, which was the last object that quitted the scene. The sun becoming powerful, the vapour was rarefied, and the whole of the magic scene disappeared.

The two first of these exhibitions of the *fata morgana* were evidently caused by the reflection of some of the buildings and other parts of the town of Youghal in a dense vapour or fog strongly illuminated by the sun. But in order to have an adequate idea of the nature of the phenomenon, let AG (fig. 1.) be a fog bank or dense vapour, whose surface next the sun is uneven, and formed of a variety of planes capable of reflecting light, as AB, BC, CD, DE, EF, and FG. Let O be a house and tree. Now, by the laws of optics, if a spectator be so situated, as at I, that the reflective rays proceeding from the incident ones OG, OF, &c. meet the eye of the spectator at I, the image of the house and tree at O will be multiplied into the town *vr*, in which, if the surface DE is cylindrical and somewhat irregular at the top, the image of the house will be transformed into a tower, and the roof into a spire, with the chimney a flag. Also, if any of the other planes be imperfect, the images reflected therefrom will be imperfect, and the houses appear in ruins. If the spectator move from I to L, and during that time the air should change any of the surfaces, the representation will be somewhat changed; the image of O, from the plane DE, will become a tower with a dome, and the whole will appear as at *xy*. As the wind changes the form of the fog, or the position of the sun or clouds alters the lights, the entire representation will disappear, or suffer considerable changes; on which account none of those aërial exhibitions continue any length of time, and always in calm weather and a clear sky, if the picture is brilliant; for, though those fog banks often appear in dark or cloudy weather, the reflection is imperfect, and represents only confused images of rocks, mountains, and capes. Though distant objects are reflected, those immediately under or behind will be refracted. Thus, in fig. 2, if a vapour rest upon an horizontal plane AB, the point B will be refracted to *a*, when the plane will represent a hill to a spectator at I. The scenery may also be represented by refraction only; for, if the fog or vapour should contain two smooth surfaces opposite to each other, in the manner of a double concave lens, objects will be seen refracted, though much diminished in apparent magnitude; and if one or both of the concave surfaces should be composed of different inclined planes, a single object will be variously multiplied and transformed. Thus, let AB (fig. 3.) represent a vapour, whose surfaces are concave and transparent, but of different faces, as CD, DE, and EF, the object M will be seen by a spectator at G small and at a great distance beyond M, and multiplied as at PQ. And this case was exhibited from a bog vapour in the county of Kildare, in the year 1787. About eleven o'clock in the morning, the sun shining clear, a hill appeared, about a mile distant, covered with trees and houses, where it was known there was only a plain field; the phenomenon being caused by a house and garden refracted through a dense and facetwise concave vapour arising from the bog.

These phenomena are also frequently caused by the light refracted through the crystalline parts of the vapour, without any of the adjacent objects being either refracted or reflected; for the vapour, being formed into different parts, the light refracted through them caused the confused appearance of ruins, houses, woods, lawns, &c. in the same manner as a board, covered in an irregular manner with black and white spots mixed with lines, will, at a certain distance, resemble a landscape with woods, ruins, houses, trees, castles, &c., and under such imposing forms as to appear real representations. Of this species of the *fata morgana* seem to be those seen at Youghal in 1801, before spoken of; but in whatever manner the representations from vapours and fogs are formed, the weather must be calm and serene, otherwise the vapours will be broken and dispersed by the wind.

* * *

Tulips.

The love of tulips, and the anxiety to possess those which were rare, raged to such an extent in Holland, from the year 1634 to 1637, that the Dutch of all ranks, from the greatest to the meanest, neglected their occupations and sold their manufactures, and mechanics even their tools, to engage in the tulip trade. Accordingly we find in those days that they fetched the most extravagant prices. The Viceroy was sold for £250; Admiral Lefken, £440; Admiral Von Eyck, £160; Greber, £148; Schilder, 160; Semper Augustus, £550. Whether there was any thing in the name, or it was the peculiar beauty of the flower which enhanced the price, does not appear certain; it is enough to prove the folly of the age, to know that such prices were obtained. In 1637, a collection of tulips of Wonter Brockholsmenster was sold by his executors for £9,000. Of all the tulips, the Semper Augustus was the favourite, and the price we have assigned it is much less than it frequently produced. A fine Spanish cabinet, valued at £1,000 and £300 besides, were once given for a Semper Augustus; and another gentleman sold three stocks of the same flower for £1,000 each. The same gentleman was offered for this flower £1,500 a-year for seven years, and every thing to be left as found, only reserving the increase during that time for the money. Another gentleman, by the sale of his tulips, got the sum of £6,000 in less than four months. The tulip madness at length rose to such a pitch, that the government deemed it necessary to interfere; and accordingly, in 1637, a check was put to it by an order of the state for invalidating all contracts of which a tulip was the subject.

* * *

Sun's Rising and Setting.

The following is an average weekly account of the rising and setting of the sun, very ingeniously calculated for any year, by Mr. George Cromwell, Bell Yard, Doctors' Commons, London:

	Rises.		Sets.		
Dec. 29	8	8	3	52	Dec. 20
—— 27	8	6	3	54	—— 13
Jan. 4	8	2	3	58	—— 6
—— 11	7	54	4	6	Nov. 29
*—— 18	7	46	4	14	—— 22*
—— 25	7	38	4	22	—— 15
Feb. 1	7	28	4	32	—— 8
—— 8	7	17	4	43	—— 1
—— 15	7	5	4	55	Oct. 25
—— 22	6	50	5	10	—— 18
March 1	6	34	5	26	—— 11
—— 8	6	18	5	42	—— 4
—— 15	6	5	5	55	Sept. 27
—— 22	5	53	6	7	—— 20
—— 29	5	41	6	19	—— 13
April 5	5	29	6	31	—— 6
—— 12	5	15	6	45	Aug. 30
—— 19	5	0	7	0	—— 23
—— 26	4	46	7	14	—— 16
May 3	4	32	7	28	—— 9
—— 10	4	20	7	40	—— 2
—— 17	4	10	7	50	July 26
*—— 24	4	0	8	0	—— 19*
—— 31	3	53	8	7	—— 12
June 7	3	47	8	13	—— 5
—— 14	3	44	8	16	June 28
—— 21	3	42	8	18	—— 21

This table contains a weekly list of PARALLEL DAYS, or CORRESPONDING SEASONS; to shew, if the sun rises and sets at a certain time, on any enumerated day, on what *other* day in the year it will rise and set *at the same time.*

If, for instance, the sun rises at 46 minutes after 7, and sets at 14 minutes after 4. on the 18th of January, the same will happen on the 22d of November. Again, if it rises at 4, and sets at 8, on the 24th of May, so it will on the 19th of July. The table may also serve as a convenient reference, to find on what day of the week any given date will occur, by reading the following plain rules:

For the year 1822, all the enumerated dates will fall on a Friday: of course, any intermediate day will be easily discovered.

In 1823 every date will be a Saturday.
1824, being Leap Year, the dates in Jan. and Feb. will fall on a ...... Sunday.
The remaining ten months of that year on a.............. Monday.
1825 .... Tuesday.
1826 .... Wednesday.
1827 .... Thursday.
and so on.

Statistics.

A NATION, without being exhausted, can annually afford to employ the one-hundredth part of its population in the profession of arms. The quota which England could afford, according to this proportion, in addition to its military and naval establishments previous to the peace of 1814, without exhaustion, would be 170,000, of which 70,000 would suffice for the navy, and 100,000 for the army.

In Great Britain, the number of men capable of rising in arms, *en masse*, from fifteen to sixty years of age, is 2,744,847, or about four in every seventeen males.

The total number of inhabited houses in England, in 1801, was 1,474,740. In 1690, there was 1,310,213. In 1759, the surveyors of the house and window duties returned 986,412; and in 1781, 1,005,810.

There are in Great Britain six millions of males, and in Ireland, three millions; of whom, in the year 1812, 807,000 were in arms, that is in the proportion of one to eleven.

In Great Britain there die every year about 332,700; every month, about 25,592; every week, 6398; every day, 914; and every hour, about 40.

The proportion of deaths of women to that of men is fifty-four to fifty.

Half of all that are born, die before they attain 17 years.

Taking the whole of the population of the metropolis, according to the Census of 1811, at 1,099,104, the proportion of males to females is as 100 to 128.

The small pox, in the natural way, usually carries off eight out of every hundred. By vaccination, one dies out of every three hundred; but, according to Dr. Willan, one in two hundred and fifty dies of innoculated small-pox.

The clergy of the church of England, including their families, form about one-eightieth part of the population of England.

Pores of the Human Body.

THE skin of the human body, is a very curious object for the microscope. By cutting a thin piece with a very sharp pen-knife or razor, and applying it to a good microscope, a multitude of small pores will be seen, through which the perspirable matter is supposed to be perpetually transmitted. These are best seen in the under or second skin. There are said to be 1000 pores in the length of an inch, and of course, in a surface an inch square, there will be 1,000,000, through which, either the sensible or insensible perspiration is continually issuing.

If there are 1,000,000 pores in every square inch, the following calculation is made of the number in the whole body:

The surface of the body of a middle-sized person, is reckoned to contain 14 feet; and, as each foot contains 144 inches, the number of pores will be estimated at 1,000,000 + 144 + 14 = 2,016,000,000, or two thousand and sixteen millions.

New Mechanical Power.

THE following singular advertisement is now of frequent appearance in the American newspapers:

"*The intelligence and Activity of the Dog, converted into a Power for a variety of useful purposes.*—The subscriber having obtained letters patent for the application of the agency of dogs, as a new power for various useful purposes, is ready to sell patent rights, for the application of his principle, to such as the following purposes:

"For pumping water, irrigating meadows, gardens, &c.; grinding paint, corn, bark, and other articles; turning the grindstone, the lathe, carding and spinning machines, and washing machines; working churns; assisting rope-makers; threshing and cleaning grain; cutting straw, tobacco, shingles, dye-wood; chopping meat, &c. &c. and for a great variety of other purposes, where the employment of canine agency will prove highly economical and profitable. The requisite machinery is simple, and constructed with little expense. The patent right will be sold at a very low rate. Able dogs can easily be procured and trained for this object. The subscriber has had several employed in this manner for some years, and they have invariably been healthy and robust, and apparently delighted with their employment. The advantage of this principle, and its multifarious adaptation, are obvious.—By these means, a very interesting portion of the animal creation, hitherto more or less prescribed, is thus made subservient to the most useful operations. One dog will labour to more advantage than two men. The saving of labour and expense is extraordinarily great. Several machines of this kind are already in operation in this city and neighbourhood.

"Persons desirous to convince themselves of the efficacy of canine agency, applied as before stated, and those who wish to purchase the privilege of using this valuable improvement, are respectfully invited to call on

"ANTHONY TIEMAN,

"At Rosehill-street, near Love-lane, east side of Broadway,
New York."

* * *

Timber in a Seventy-four Gun Ship.

A SEVENTY-FOUR gun ship will swallow up nearly 3,000 loads of oak timber: a load of oak timber contains fifty cubical feet, and a ton forty feet; so that a seventy-four gun ship takes 2,000 large well-grown timber trees, of perhaps two tons each. The distance recommended for planting trees is thirty feet; but supposing trees to stand at the distance of two rods, (thirty-three feet) each statute acre would contain forty trees; of course, the building of a seventy-four gun ship would clear the timber of fifty acres. Even supposing the trees to stand one rod apart, (a short distance for trees of the magnitude above-mentioned) it would clear twelve acres and a half; no inconsiderable plot of ground. The complaints relative to the decrease of our timber are not to be wondered at under such circumstances; and this calculation points out to landed proprietors the necessity and patriotism of continually planting more trees to supply our future wants.

⁂

Lost Hours.

ONE person rises in the morning at half-past nine, another at six. If each live to be fifty years old, the one will have enjoyed sixty-three thousand eight hundred and seventy-five hours, or *two thousand six hundred and sixty-one days* more than the other. Let us suppose, that there are throughout Great Britain one million five hundred thousand persons who rise at a quarter past nine, *or later*. Of these, perhaps, nine hundred and fifty thousand would, if they rose at six, be usefully employed. At this rate, fifty-six thousand three hundred and forty-six millions, eight hundred and seventy-five thousand hours, or six millions four hundred and thirty-two thousand, two hundred and ninety-two years of individual improvement are lost to society every half century. —This is supposing, that these nine hundred and fifty thousand get up at a quarter past nine, whereas thousands do not leave their beds till eleven or twelve.

All this time is uninterrupted day, and composed of hours in which the intellect is far clearer and more fit for study, than the rest of the day.

It must be remembered, too, that nothing conduces more to health, and consequently to longevity, than early rising.

Suppose, out of the above number of persons, five hundred thousand should live four years longer than they otherwise would have done, viz. fifty-four years instead of fifty; according to the ratio above, here are *two millions* more years of actual existence utterly wasted.

The Number Nine.

THE following discovery of remarkable properties of number 9 was accidentally made by Mr. V. Green, more than forty years since, though, we believe not generally known.

9
1
9..9
2
18..1+8=9
3
27..2+7=9
4
36..3+6=9
5
45..4+5=9
6
54..5+4=9
7
63..6+3=9
8
72..7+2=9
9
81..8+1=9

The component figures of the product, made by the multiplication of every digit into the number 9, when added together, make NINE.

The order of these component figures is reversed, after the said number has been multiplied by 5.

The component figures of the amount of the multipliers, (viz. 45) when added together make NINE.

The amount of the several products, or multiples of 9, (viz. 405) when divided by 9, gives for a quotient, 45; that is 4 + 5 = NINE.

The amount of the first product, (viz. 9) when added to the other products, whose respective component figures make 9, is 81; which is the *square* of NINE.

The said number 81, when added to the above-mentioned amount of the several products, or multiples of 9 (viz. 405) makes 486; which, if divided by 9, gives for a quotient 54; that is 5 + 4 = NINE.

It is also observable that the number of changes that may be rung on *nine* bells, is 362,880; which figures, added together, make 27; that is, 2 + 7 = NINE.

And the quotient of 362,880, divided by 9, is 40,320: that is 4 + 0 + 3 + 2 + 0 = NINE.

* * *

Mahomet's Coffin.

ONE of the most celebrated wonders of the East, is the suspension of Mahomet's coffin, by the attraction of magnets. The following description of the situation in which this curiosity stood in 1804, is from the pen of an enterprising American traveller, Mr. Anderson, whose travels are as yet (1820) unpublished. The vault is in Medina, and situated contiguous to the grand Mosque, through which, and two inferior buildings, termed majets, the passage leads to the vault, the entrance into which is by a small door or aperture, arched at top, in a stone wall seven or eight feet thick. The vault inside is round, likewise arched at top, although octagon without: the size in the interior about nine feet wide, and ten to eleven feet high, without aperture to admit light: the loss of which is supplied by lamps, which are constantly burning. At the top of the dome, or arch, is inserted a square dove coloured stone or slab of marble, into which is inserted another stone of dark brownish hue, round, about seven or eight inches in diameter, and probably eighteen inches in length, projecting downwards. At the centre of the floor, which is of stone, there is a pile of marble tables or slabs, about eighteen or twenty inches square, and two feet high, into the top of one of which is inserted a similar stone to the one just described as at the top, projecting upwards: its diameter, however, does not exceed three inches. From the stone at the top projects, on the right and left, two rods, apparently of iron, extending to the side walls, at their extreme height, where the arch springs, thence down the side walls to about midway, where it curves off towards the centre of the whole space inside the vault. At the end of these rods, are bulbs resembling a four pound shot, black or dark brown, but not rusty; between these four points, but *detached from all*, stands *erect*, a box or coffin, four feet and a half long, by eighteen inches square, how thick or of what metal Mr. A. does not pretend to say, but *thinks* it not probable it is steel, washed with some composition, as its appearance was white, but not polished. At either end of the coffin or box, was a half round bulb of a similar appearance to those on the ends of the rods. The ends of the rods come not immediately opposite to the centre of the coffin, but somewhat below it.

Mr. Anderson, when at Medina, was given to understand, that although he was not the only European who had visited the vault, he was the first Christian traveller who was permitted actually to enter the interior.

The vault is open only on particular days, and few, even of the religion of the country, are permitted to approach nearer than the grand Mosque, from which, through the aperture already described, the visitors have an opportunity of seeing the coffin. But Mr. A's curiosity was not so easily gratified. A number of impediments in the way, he surmounted them all, and when in the interior, actually passed his sword at either side of the coffin, which very sensibly *vibrated* as the steel approached it!

Capacious Beer Casks.

A FEW years before Mr. Thrale's death, which happened in 1781, an emulation arose among the brewers to exceed each other in the size of their casks, for keeping beer to a certain age; probably, says Sir John Hawkins, taking the hint from the tun at Heidelberg, of which the following is a description:

At Heidelberg, on the river Neckar, near its junction with the Rhine in Germany, there was a tun or wine vessel constructed in 1343, which contained twenty-one pipes. Another was made, or rather the one now mentioned rebuilt, in 1664, which held six hundred hogsheads, English measure. This was emptied, and knocked to pieces by the French in 1688. But a new and larger one was afterwards fabricated, which held eight hundred hogsheads. It was formerly kept full of the best Rhenish wine, and the Electors have given many entertainments on its platform; but this convivial monument of ancient hospitality is now, says Mr. Walker, but a melancholy, unsocial, solitary instance of the extinction of hospitality: it moulders in a damp vault, quite empty.

The celebrated tun of Konigstein, is said to be the most capacious cask in the world: holding 1,869,336 pints. The top is railed in, and it affords room for twenty people to regale themselves. There are also several kinds of welcome cups, which are offered to strangers, who are invited by a Latin inscription, to drink to the prosperity of the whole universe. This enormous tun was built in 1725, by Frederick Augustus, King of Poland, and Elector of Saxony, who, in the inscription just mentioned, is styled "the father of his country, the Titus of his age, and the delight of mankind."

Dr. Johnson once mentioned, that his friend Thrale had four casks so large, that each of them held 1000 hogsheads. But Mr. Meux, of Liquorpond street, Gray's Inn lane, can, according to Mr. Pennant, shew twenty-four vessels containing in all 35,000 barrels; one alone holds 4,500 barrels; and in the year 1790, this enterprising brewer built another, which contains nearly 12,000 barrels valued at about £20,000. A dinner was given to 200 people at the bottom of it, and 200 more joined the company to drink success to this unrivalled vat.

⁂

Tavern Signs.

"I'M amaz'd at the signs
As I pass through the town,
To see the odd mixture—
A *magpye* and *crown*,
The *whale* and the *crow*,
The *razor* and *hen*,
The *leg* and *seven stars*,
The *axe* and the *bottle*,
The *tun* and the *lute*,
The *eagle* and *child*.
The *shovel* and *boot*."

British Apollo, 1710.

The absurdities which tavern signs present are often curious enough, but may in general be traced to that inveterate propensity, which the vulgar of all countries have, to make havoc with every thing in the shape of a proper name. What a *magpye* could have had to do with a *crown*, or a *whale* with a *crow*, or a *hen* with a *razor*, it is as difficult to conjecture, as to trace the corruption of language in which the connexion more probably originated. The sign of the *leg* and the *seven stars*, was merely an orthographical deviation from the *league* and *seven stars*, or seven united provinces; and the *axe* and *bottle* was, doubtless, a transposition of the *battle-axe*, a most appropriate sign for warlike times The *tun* and *lute* formed suitable enough emblems of the pleasures of wine and music. The *eagle* and *child*, too, had meaning, though no application; but when we come to the *shovel* and *boot*, nonsense again triumphs, and it is in vain that we look for any rational explanation of the affinity.

The *Swan-with-two-necks* has long been an object of mystery to the curious. This mystery is solved by the alteration of a single letter. The sign, as it originally stood, was the *swan-with-two-nicks;* the meaning of which we find thus fully explained in a communication made by the late Sir Joseph Banks, to the Antiquarian Society. At a meeting of the Society, in January, 1810, Sir Joseph presented to the Society a curious parchment roll, exhibiting the marks, or nicks, made on the beaks of swans and cygnets in all the rivers and lakes in Lincolnshire, accompanied with an account of the privileges of certain persons keeping swans in these waters, and the duties of the king's swanherd in guarding these fowls from depredation, and preventing any two persons from adopting the same figures or marks on the bills of their swans. The number of marks contained in the parchment roll amounted to 219, all of which were different, and confined to the small extent of the bill of the swan. The outlines were an oblong square, circular at one end, and containing dots, notches, arrows, or such like figures, to constitute the difference in each man's swans. Laws were enacted so late as the 12th of Elizabeth, for the preservation of the swans in Lincolnshire.

The *goat and compasses* has been supposed to have its origin in the resemblance between the bounding of a goat and the expansion of a pair of compasses; but nothing can be more fanciful. The sign is of the days of the Commonwealth, when it was the fashion to give scriptural names to every thing and every body; and when, *God-be-praised Barebones* preferred drinking his tankard of ale at the *God encompasseth us* to any where else. The corruption from *God encompasseth us*, to *goat and compasses*, is obvious and natural enough.

In Richard Flecknoe's enigmatical characters, published in 1665, speaking of the "fanatic reformers," he observes, "As for the SIGNS, they have pretty well begun their reformation already, changing the sign of the *salutation of the angel and our lady* into the *soldier and citizen*, and the *Katherine wheel* into the *cat and wheel;* so as there only wants their making the *dragon* to kill *St. George*, and the *devil* to tweak *St. Dunstan* by the nose, to make the reformation complete. Such ridiculous work they make of their reformation, and so zealous are they against all mirth and jollity, as they would pluck down the signs of the *cat* *and fiddle* too, if it durst but play so loud as they might hear it."

The *bag of nails*, at Chelsea, is claimed by the smiths and carpenters of the neighbourhood, as a house designed for their peculiar accommodation; but had it not been for the corruption of the times, it would still have belonged to the *bacchanals*, who, in the time of a Ben Johnson, used to take a holiday stroll to this delightful village. One age has converted *bacchanals* into *bag-o'-nails;* may we not expect that the next will convert *bacchanalians* into *bag-o'-nailians?*

The origin of the *chequers*, which is so common an emblem of public houses, has been the subject of much learned conjecture. One writer supposes that they were meant to represent that the game of draughts might be played there; another has been informed by a very noble personage, that in the reign of Philip and Mary, the then Earl of Arundel had a grant to license public-houses, and part of the armorial bearings of that noble family being a chequer-board, the publican, to shew that he had a licence, put out that mark as part of his sign. But, unfortunately for both solutions, unfortunately for the honours of Arundel, Sir W. Hamilton presented, some time ago, to the Society of Antiquaries, a view of a street in Pompeii, in which we find that shops with the sign of the chequers were common among the Romans! The real origin of this emblem is still involved in obscurity. The wittiest, though certainly not the most genuine explanation of it, was that of the late George Selwyn, who used to wonder that antiquarians should be at any loss to discover why *draughts* were an appropriate emblem for *drinking houses.*

An annotator, of the year 1807, on Beloe's Anecdotes of Literature, says, "I remember, many years ago, passing through a court in Rosemary Lane, where I observed an ancient sign over the door of an ale-house; which was called *The Four Alls.* There was the figure of a king, and on a label, "I rule all;" the figure of a priest, motto, "I pray for all; a soldier. "I fight for all;" and a yeoman, "I pay all." About two years ago I passed through the same thoroughfare, and looking up for my curious sign, I was amazed to see a painted board occupy its place, with these words inscribed, "*The Four Awls.*" In Whitechapel Road is a public-house which has a written sign, "*The Grave Morris.*" A painter was commissioned to embody the inscription; but this painter had not a poet's eye; he could not body forth the form of things unknown. In his distress he applied to a friend who presently relieved him, and the painter delineated, as well as he could, "*The Graaf Maurice,*" often mentioned in the "*Epistolæ Hoelianæ.*"

* * *

Power of the Steam Engine.

A WELL-CONSTRUCTED steam engine, with a cylinder thirty inches in diameter, will perform the work of forty horses; and, as it may be made to act without intermission, while horses will not work more than eight hours in the day, it will do the work of *one hundred and twenty horses;* and further, the work of a horse being equal to that of five men, it will perform as much as *six hundred men* can, and the whole expense of it is equal to about as much as that of half the number of horses for which it is substituted. The only thing to which these machines were at first applied, was the raising of water from coal-pits, mines, &c.; but they are now used for many different purposes in which great power is required. Mr. Bolton has applied this force to his apparatus for coining, which, by the help of four boys only, is capable of striking *thirty thousand* pieces of money in an hour, the machine itself keeping an accurate account of the number struck off.

* * *

The Geometrical Pen.

THE geometrical pen is an instrument, by a circular motion of which, a right line, a circle, an ellipse, and other mathematical figures, may be described. It was first invented and explained by John Baptist Suardi. Several writers had observed the curves arising from the compound motion of two circles, one moving round the other; but Suardi first realized the principle, and reduced it to practice. The number of curves this instrument can describe, is truly amazing; the author enumerates not less than 1,273, which, he says, can be described by it in the simple form.

* * *

Extraordinary Bed-ridden Mechanic.

IN the town of Alyth, in Scotland, there lately lived a man of much provincial celebrity, of the name of James Sandy. The originality of genius and eccentricity of character, which distinguished this remarkable person, have been rarely surpassed. Deprived at an early age of the use of his legs, he contrived by dint of ingenuity not only to pass his time agreeably, but to render himself an useful member of society. He soon displayed a taste for mechanical pursuits, and contrived, as a workshop for his operations, a sort of circular bed, the sides of which being raised about eighteen inches above the clothes, were employed as a platform for turning-lathes, table-vices, and cases for tools of all kinds. His genius for practical mechanics, was universal. He was skilled in all sorts of turning, and constructed several very curious lathes, as well as clocks and musical instruments of every description, no less admired for the sweetness of their tone, than the elegance of their execution. He excelled too in the construction of optical instruments, and made some reflecting telescopes, the specula of which were not inferior to those finished by the most eminent London artists. He suggested some important improvements in the machinery for spinning flax; and, we believe, he was the first who made the wooden jointed snuff-boxes, generally called Laurencekirk boxes, some of which, fabricated by this self-taught artist, were purchased and sent as presents to the royal family. To his other endowments, he added an accurate knowledge of drawing and engraving, and in both these arts produced specimens of the highest excellence. For upwards of fifty years he quitted his bed only three times, and on these occasions his house was either inundated with water or threatened with danger from fire. His curiosity, which was unbounded, prompted him to hatch different kinds of bird's eggs by the natural warmth of his body, and he afterwards reared the motley brood with all the tenderness of a parent; so that, on visiting him, it was no unusual thing to see various singing birds, to which he might be said to have given birth, perched on his head, and warbling the artificial notes he had taught them. Naturally possessed of a good constitution, and an active, cheerful turn of mind, his house was the general coffee-room of the village, where the affairs of both church and state were discussed with the utmost freedom. In consequence of long confinement, his countenance had rather a sickly cast, but it was remarkably expressive, and would have afforded a fine subject for the pencil of Wilkie, particularly when he was surrounded by his country friends. This singular man had acquired, by his ingenuity and industry, an honourable independence, and died possessed of considerable property. He married about three weeks before his death.

From this brief history of James Sandy, we may learn this very instructive lesson, that no difficulties are too great to be overcome by industry and perseverance; and that genius, though it should sometimes miss the distinction it deserves, will seldom fail, unless by its own fault, to secure competency and respectability.

* * *

Model of Paris.

In 1798, there was exhibited at Paris, a very curious model of that city, which an ingenious artist had been occupied nine years in executing. He had not contented himself with comparing and correcting all the plans of Paris ever published; he measured all the streets, squares, &c. according to the most accurate geometrical methods of measurement, and determined the inequalities of the site of that immense capital, by levelling. The greatest diameter of the model in its extent, from east to west, was fifteen feet. The mean size of the houses was three lines.

The artist had carried his accuracy so far, that each inhabittant of Paris could distinguish his own house, court-yard, and garden. The public places and gardens were represented with a most striking similitude; not only their dimensions, but their colour and ornaments could be observed. The alternate rising and falling of the plane of the model, gave to this representation a correctness which produced an effect like enchantment, if the observer supposed himself to be standing on Mont Martre, and to be looking down on the city. The artist had, with much judgment, endeavoured, by the shades of his colours, to give a point of rest to the eye; the want of which was a great failing in that model of Rome which formerly stood in the Library of St. Genevieve, and which presented to the view a dazzling mass of white gypsum. Thirty thousand trees, which distinguished the different walks, public places, and gardens, formed an agreeable contrast to the slated and tiled roofs. This model could be taken to pieces by means of screws, and packed into three boxes for the purpose of transportation.

* * *

High Numbers.

As very high numbers are somewhat difficult to apprehend, we naturally fall on contrivances to fix them in our minds, and render them familiar; but notwithstanding all the expedients that we can contrive, our ideas of high numbers are still imperfect, and generally far short of the reality; and though we can perform any computation with exactness, the answer that we obtain is often incompletely apprehended. Take, for instance, the following example.

If a person, employed in telling money, reckon an hundred pieces in a minute, and continue at work ten hours each day, he will take nearly seventeen days to reckon 1,000,000; a thousand men would take forty-five years to reckon 1,000,000,000,000, If we suppose the whole earth to be as well peopled as at present, and to have been so from the creation, and that the whole race of mankind had constantly spent their time in telling a heap consisting of 1,000,000,000,000,000,000,000,000 of pieces, they would, even at this late period of time, hardly have reckoned a thousandth part of that quantity!

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The Eighteenth Century.

THE *good old lady*, known by the name of the Eighteenth Century, who resigned all sublunary cares, on Wednesday, the 1st January, 1801, was quietly buried in the family vault of *eternity*. Her *offspring*, all of whom were cut off at the same time, consisted of 103 sons, who were known by the name of years; 36,500 grandsons and grand-daughters, called *days* and *nights*; 376,000 great-grand-children, married into the family of the *hours*; 52,560,003 great-great-grand-children, named *minutes*; and 3,153,600,000 great-great-great-grand-children, of the pigmy race of the *seconds*.

The year 1818 was a sort of *annus mirabilis*. The sum of all the figures is eighteen: the sum expressed by the two first, as well as the two last figures, is eighteen; and reckoned singly, either forwards or backwards, the sum is eighteen. This is said to be such an arithmetical combination as can never happen again in the number of any year to the end of time.

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Historical Epitaph.

A person of the name of Mary Scott was buried near the church of Dunkeld, in 1728, for whom the following singular epitaph was composed, but never engraved on her tombstone, though it has been frequently mentioned as copied from it.

Stop, passenger, until my life you read;
The living may get knowledge from the dead.
Five times five years unwedded was my life;
Five times five years I was a virtuous wife;

Ten times five years I wept a widow's woes,
Now tired of human scenes I here repose.
Betwixt my cradle and my grave were seen
Seven mighty Kings of Scotland, and a Queen;
Full twice five years the Commonwealth I saw,
Ten times the subjects rise against the law;
And, which is worse than any civil war,
A King arraigned before the subject's bar;
Swarms of sectarians, hot with hellish rage,
Cut off his royal head upon the stage.
Twice did I see old Prelacy pull'd down,
And twice the cloak did sink beneath the gown.
I saw the Stuart race thrust out—nay more,
I saw our country sold for English ore;
Our numerous nobles, who have famous been,
Sunk to the lowly number of sixteen.
Such desolation in my days have been,
I have an end of all perfection seen.

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Chances of War.

Sir Isaac Newton, in his chronology, calculates that, in no series of kings, does the average duration of each of their reigns exceed 21 years. The contingencies to which kings are exposed, can scarcely be greater than those to which the border chiefs of Scotland and England were liable of old, when almost every man of distinction, sooner or later, fell in battle. And yet it appears, that, of the family of Swinton, in Berwickshire, only twenty-two barons have occupied the estate during the long period of 731 years; which supposes, that amid a most turbulent aristocracy, amidst feudal broils, and foreign wars, a succession of border chieftains enjoyed their estates at an averageof more than 33 years each.

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The Odd Family.

In the reign of William the Third there lived in Ipswich, in Suffolk, a family, which, from the number of peculiarities belonging to it, was distinguished by the name of the *Odd Family*. Every event remarkably good or bad happened to this family on an odd day of the month, and every one of them had something odd in his or her person, manner, and behaviour: the very letters in their christian names always happened to be an odd number. The husband's name was Peter, and the wife's Rabah; they had seven children, all boys, viz. Solomon, Roger, James, Matthew, Jonas, David, and Ezekiel. The husband had but one leg, his wife but one arm. Solomon was born blind of the left eye, and Roger lost his right eye by accident; James had his left ear pulled off by a boy in a quarrel, and Matthew was born with only three fingers on his right hand; Jonas had a stump foot, and David was humpbacked; all these, except David, were remarkably short, while Ezekiel was six feet two inches high at the age of nineteen; the stump-footed Jonas and the humpbacked David got wives of fortune, but no girl would listen to the addresses of the rest. The husband's hair was as black as jet, and the wife's remarkably white, yet every one of the children's was red. The husband had the peculiar misfortune of falling into a deep sawpit, where he was starved to death in the year 1701, and his wife, refusing all kind of sustenance, died in five days after him. In the year 1703, Ezekiel enlisted as a grenadier, and although he was afterwards wounded in twenty-three places, he recovered. Roger, James, Matthew, Jonas, and David, died at different places on the same day in 1713, and Solomon and Ezekiel were drowned together in crossing the Thames, in the year 1723.

* * *

The nearest Star.

ASTRONOMERS assert, that Sirius, or the Dog Star, is the nearest to us of all the fixed ones; and they compute its distance from our earth at 2,200,000,000,000 of miles. They maintain that a sound would not reach our earth from Sirius in 50,000 years; and that a cannon-ball, flying with its usual velocity, of 480 miles an hour, would consume 523,211 years in its passage thence to our globe.

Number of Days the different Winds blow in the Course of a Year.

FROM an average of ten years, of the register kept by order of the Royal Society, it appears, that at London, the winds blow in the following order:

WINDS.	DAYS.
South-west	112
North-east	58
North-west	50
West	53
South-east	32
East	26
South	18
North	16
	365

It appears from the same register, that the south-west wind blows, at an average, more frequently than any other wind, during every month in the year, and that it blows longest in July and August; that the north-east blows most constantly during January, March, April, May, and June, and most seldom during February, July, September, and December; and that the north-west wind blows oftener from November to March, and more seldom during September and October, than any other months. The south-west winds are also most frequent at Bristol, and next to them are the north-east.

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Dissection of the Old and New Testaments.

Books in the Old Testament...	39	In the New....27	Total........66
Chapters........	929	260	1,189
Verses......	23,214	7,959	31,173
Words.....	529,439	281,258	 810,697
Letters....	2,728,100	838,380	3,566,480

APOCRYPHA.

Chapters..... 183	Verses.... 6,081	Words.. 152,185

The middle chapter, and the least in the Bible, is Psalm 117.

The middle verse is the eighth of the 118th Psalm.

The middle line is the 2d of Chronicles, 4th Chapter, and 16th verse.

The word *and* occurs in the Old Testament 35,543 times.

The same in the New Testament, 10,684.

The word *Jehovah* occurs 1,855 times.

OLD TESTAMENT.

The middle book is Proverbs.

The middle chapter is Job 29.

The middle verse is the 1st of Chronicles, 20th chapter. between the 17th and 18th verses.

The least verse is the 1st of Chronicles, 1st chapter, and 1st verse.

NEW TESTAMENT.

The middle book is the 2d of Thessalonians.

The middle chapter is between the 13th and 14th of Romans.

The middle verse is the 17th chapter of Acts, and 17th verse.

The least verse is the 17th chapter of John, verse 35.

The 21st verse of the 7th chapter of Ezra, has all the letters of the alphabet in it.

The 19th chapter of the 2d of Kings, and the 37th of Isaiah, are alike.

N. B. Three years are said to have been lost in this curious but idle calculation.

* * *

Price of Bibles.

In the year 1274, the price of a small Bible, neatly written, was thirty pounds, which sum was no doubt equal to £200 of our present money. A good Bible may now be had for three or four shillings. It is said that the building of two arches of London Bridge cost only £25, which is £5 less than a copy of the Bible many years afterwards. Of what incalculable value is the art of printing! We see its beneficial effects more widely extended than ever, by the means of Sunday Schools, Bible Societies, and Christian Missions.

* * *

Bibliomancy.

Bibliomancy, or divination by the Bible, had become so common in the fifth century, that several councils were obliged expressly to forbid it as injurious to religion, and savouring of idolatry.

This kind of divination was named Sortes Sanctorum, or Sortes Sacræ, Lots of the Saints, or Sacred Lots; and consisted in suddenly opening, or dipping into the Bible, and regarding the passage that first presented itself to the eye, as predicting the future lot of the inquirer. The Sortes Sanctorum had succeeded the Sortes Homericæ, and Sortes Virgilianæ of the Pagans; among whom, it was customary to take the work of some famous poet, as Homer or Virgil, and write out different verses on separate scrolls, and afterwards draw one of them; or else, opening the book suddenly, consider the first verse that presented itself, as a prognostication of future events. Even the vagrant fortune-tellers, like some of the gipsies of our own times, adopted this method of imposing upon the credulity of the ignorant. The nations of the east retain the practice to the present day. The late usurper, Nadir Shah, twice decided upon besieging cities, by opening upon verses of the celebrated poet Hafiz.

This abuse, which was first introduced into the church about the third century, by the superstition of the people, afterwards gained ground, through the ignorance of some of the clergy, who permitted prayers to be read in the churches for this very purpose. It was, therefore, found necessary to ordain in the council of Vannes, held A. D. 465, "that whoever of the clergy or laity should be detected in the practice of this art, should be cast out of the communion of the church." In 506, the council of Agde renewed the decree; and, in 578, the council of Auxerre, amongst other kinds of divination, forbade the Lots of the Saints, as they were called, adding, "let all things be done in the name of the Lord;" but those ordinances did not effectually suppress them, for we find them again noticed and condemned in a capitulary or edict of Charlemagne, in 793. Indeed, all endeavours to banish them from the Christian church appear to have been in vain for many ages.

Distance of the Sun.

THE distance of the Sun from the earth in round numbers, is about 95 millions of miles, a distance so prodigious, that a cannon ball, which moves at the rate of about eight miles in a minute, would be something more than twenty-two years in going thither.

Mock Suns.

ON the 25th of March, 1798, the following curious phenomenon was observed at Niort. Between the hours of six and eight in the morning, the sun appeared, accompanied by two radiant circles, resembling two other suns, one on the right, and the other on the left; and which, with the real sun as a base, seemed to compose a triangle. These two supernumerary suns were so exceedingly bright, that it was impossible to keep the eyes fixed on them for any length of time. They disappeared gradually; that on the east disappeared first, and at the end of two hours, they were both invisible.

Phenomena of this description, though not frequent, have been seen at different periods. Augustine takes notice of two mock suns, which were seen before the Christian æra. Zonaras mentions two seen after the death of Christ; Palmerius, three seen in 1466; Surius, three seen at Wirtemberg in 1514; Fromundus, three seen in 1619; and Cardan, three seen at Venice in 1532.

In Britain, according to our old chronicles, five suns were plainly seen at one time, and at a great distance from each other, in the year 346; three were seen in 812; three in 953; and five in 1233. Lilly mentions three seen on the 19th of November, 1644; and three seen on the 28th of February, 1648. A most remarkable phenomenon of this kind, where five parhelia were seen at once, is mentioned in the eighth volume of the New Transactions of the Imperial Academy at St. Petersburgh.

* * *

Wars between England and France.

1141, one year.—1161, twenty-five years.—1211, fifteen years.—1224, nine years.—1294, five years.1339, twenty-one years.—1368, fifty-two years.—1422, forty-nine years.—1492, one month.—1512, two years.—1521, six years.—1549, one year.—1557, two years.—1562, two years,—1627, two years.—1666, one year.—1689, ten years.—1702, eleven years.—1744, four years.—1756, seven years.—1776, seven years.—1793, nine years.—1803, eleven years.—And lastly, 1815, when this calculation was made, fourteen years; making, within a period of 700 years, 266 years of desolating war!

* * *

Immense Lift.

In the journal of North Brabant, for the year 1819, there is a curious narrative of the complete removal of a windmill, over a space of five thousand five hundred and twenty feet! The removal of the mill was effected in twelve days, from its original site to that which was subsequently chosen for it. No part of this enormous mass was shaken, and the mill continued in full work during the operation. Even a glass, filled with water, placed in the gallery, suffered no agitation, although the mill advanced, each day, a distance of four hundred and sixty feet. In the same manner the transportation was effected of a house attached to the mill, twenty-three feet deep, and twenty-seven long. This house was built for the most part of stone; the removal of it was effected in five days. The machinery for the purpose is said to have been constructed in the simplest manner. The engineer, who directed the operation, was M. Homberger d'Osterwick.

* * *

Extraordinary Draught.

The following notice is extracted from a New York paper, of November, 1820.

Alexandria, Nov. 23.

Extraordinary.—Arrived yesterday in town, at the store of Messrs. Gibson and Lupton, King-street, the waggon and team of Robert W. Hamilton, Esq. from Hamilton's Mills, near Winchester, with a load of *fifty-five* barrels of flour, weighing *eleven thousand nine hundred and ninety pounds.* The team is composed of six horses, and the distance which they drew this astonishing load, *eight miles.* The weight of the waggon, ascertained at the hay-scales, is 2,914 lbs. which, added to that of the flour, makes the sum total 4,793 lbs. a weight of 2,465½ lbs. on each horse. Singular as the fact is, it was discovered by many of the citizens of our town, that the horses, so far from being wearied, absolutely, on several occasions, trotted through the streets under this amazing pressure.

The length of the waggon is *twenty-six feet eight inches,* made by George Bosteyon, of Winchester, and for strength and workmanship, is perhaps equal to any thing of the kind ever constructed in the state. Mr. Hamilton, the proprietor of this extraordinary team and load, we conceive entitled to much credit; his indefatigable attention to the improvement of his horses, is amply evinced by this amazing evidence of their strength. It will, no doubt, be recollected, that this team ascended the Blue Ridge, and crossed the Shenandoah river, parts of the road esteemed difficult and dangerous.

The driver entered the town with the national flag flying from the centre of his waggon, accompanied by a great number of citizens, whose curiosity had prompted them to meet it on the road, affording one of the most moral and interesting spectacles, which, for a long time, has been exhibited in this place.

Sailing Chariot.

A CHARIOT, on wheels, to be impelled by the wind, was constructed, in the last century, by Stephinus, at Scheveling, in Holland, and is celebrated by many writers. Its velocity is said to have been so great, that it would carry eight or ten persons from Scheveling to Putten, which is distant forty-two English miles, in two hours. Plate VII. presents a perspective view of it. A B is the body of the carriage, which is driven before the wind by the sails C D, and guided by the rudder F. The wheels require to be farther asunder, and the axletrees longer, than in ordinary carriages, to prevent overturning.

Carriages of this kind are said to be frequent in China; and in any wide level country, must be sometimes both pleasant and profitable. The great inconvenience attending the machine is, that it can only go in the direction the wind blows, and even not then, unless it blows strong; so that after you have got some way on your journey, if the wind should fail, or change, you must either proceed on foot, or stand still.

The Hollanders have small vessels, somewhat of this description, which carry one or two persons on the ice, having a sledge at bottom instead of wheels; and being made in the form of a boat, if the ice break, the passengers are secured from drowning.

* * *

Tenuity of Gold and Silver Wire.

GOLD-WIRE, or what commonly goes by that name, is made of cylindrical ingots of silver, covered over with a skin of gold, and then drawn successively through a vast number of holes, each smaller and smaller, till at last, it is brought to a fineness exceeding that of a hair. This admirable ductility, which makes one of the distinguishing characteristics of gold, is no where more conspicuous than in this gilt wire. A cylinder of forty-eight ounces of silver, covered with a coat of gold only weighing one ounce, as Dr. Halley informs us, is usually drawn into a wire, two yards of which weigh no more than one grain; whence 98 yards of the wire weigh no more than 49 grains, and one single grain of gold covers the 98 yards, so that the ten-thousandth part of a grain is above one-eighth of an inch long.

Silver-wire is the same with gold-wire, except that the latter is gilt, or covered with gold, and the other is not.

It may be observed, that before the wire is reduced to this excessive fineness, it is drawn through above 140 different holes, and that each time they draw it, it is rubbed over afresh with new wax, both to facilitate its passage, and to prevent the silver appearing through it.

Gold-thread, or spun-gold, is flatted gold, wrapped or laid over a thread of silk, by twisting it with a wheel and iron bobbin.

The manner of forming gold-wire, and gold-thread, both round and flat, is performed in the following way: First, an ingot of silver, of 24 pounds, is forged into a cylinder of about an inch in diameter; then it is drawn through eight or ten holes, of a large coarse wire-drawing iron, both to finish the roundness and to reduce it to about three-fourths of its former diameter. This done, they file it very carefully all over, to take off any filth remaining from the forge; they then cut it in the middle, and thus make two equal ingots thereof, each about 26 inches long, which they draw through several holes, to take off any inequalities the file may have left, and to render it as smooth and equable as possible.

When the ingot is thus far prepared, they heat it in a charcoal-fire; then taking some gold leaves, each about four inches square, and weighing twelve grains, they join four, eight, twelve, or sixteen of these, as the wire is intended to be more or less gilt; and when they are so joined as only to form a single leaf, they are applied over the whole surface of the hot ingot, and burnished or rubbed well down with the blood-stone, to close and smooth them. When gilt, the ingots are laid anew in a coal fire; and when raised to a certain degree of heat, they go over them a second time with the blood-stone, both to solder the gold more perfectly, and to finish the polishing. The gilding finished, it remains to draw the ingot into wire.

In order to this, they pass it through twenty holes of a moderate drawing-iron, by which it is brought to the thickness of the tag of a lace; from this time the ingot loses its name, and becomes gold wire. Twenty holes more of a lesser iron, leave it small enough for the least iron; the finest holes of which last, scarcely exceeding the hair of the head, finish the work.

To dispose the wire to be spun on silk, they pass it between two rollers of a little mill; these rollers are of nicely polished steel, and about three inches in diameter. They are set very close to each other, and turned by means of a handle fastened to one of them, which gives motion to the other. The gold wire, in passing between the two, is rendered quite flat, but without losing any thing of its gilding, and is rendered so exceedingly thin and flexible, that it is easily spun on silk thread, by means of a hand-wheel, and so wound on a spool or bobbin.

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Spider's Thread.

In the Introduction to Entomology, by Kirby and Spence, there is a very curious description of the process by which the spider weaves its web. After describing the four spinners, as they are termed, from which the visible thread proceeds, the writer goes on to mention, that these are the machinery through which, by a process more singular than that of rope-spinning, the thread is drawn. Each spinner is pierced, like the plate of a wire-drawer, with a multitude of holes, so numerous and exquisitely fine, that a space often not bigger than a pin's point, includes above a thousand. Through each of these holes proceeds a thread of an inconceivable tenuity, which, immediately after issuing from the orifice, unites with all the other threads, from the same spinner, into one. Hence from each spinner proceeds a compound thread; and these four threads, at the distance of about one-tenth of an inch from the apex of the spinner, again unite, and form the thread we are accustomed to see, which the spider uses in constructing its web. Thus, a spider's web, even spun by the smallest species, and when so fine, that it is almost imperceptible to our senses, is not, as we suppose, a single line, but a rope composed of at least four
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thousand strands. But to feel all the wonders of this fact, we must follow Leuwenhoeck in one of his calculations on the subject. This renowned microscopic observer found, by an accurate estimation, that the threads of the minutest spiders, some of which are not larger than a grain of sand, are so fine, that four millions of them would not exceed in thickness, one of the hairs of his beard. Now we know, that each of these threads is composed of above four thousand still finer. It follows, therefore, that above sixteen thousand millions of the finest threads which issue from such spiders, are not, altogether, thicker than a human hair!

It has long been a question among philosophers, whether it be possible to render the labonrs of the spider subservient to the benefit of mankind. In the earlier part of last century, Bon, of Languedoc, fabricated a pair of stockings, and a pair of gloves, from the threads of spiders. They were nearly as strong as silk, and of a beautiful grey colour. The predacious habits of these animals, however, would seem to oppose an effectual barrier to their being bred up in sufficient numbers to render such a manufactory at all productive. The following arguments against the probability of any permanent or real advantage resulting from this attempt, were published by Reaumur, whom the Royal Academy had deputed to inquire into the matter.

The natural fierceness of spiders renders them unfit to be bred and kept together. Four or five thousand being distributed in cells, fifty in some, one or two hundred in others, the big ones soon killed and eat the smaller ones, so that in a short time there were scarcely above one or two left in each cell; and to this inclination of devouring their own species is attributed the scarcity of spiders, when compared with the vast number of eggs they lay. Reaumer also affirms, that the web of the spider is inferior in strength and lustre to that of the silk-worm, and produces less of the material fit for use. The thread of the spider's web can only bear a weight of two grains without breaking; and the bag sustains the weight of thirty-six grains: the thread of a silk-worm will bear two drams and a half, so that five threads of the spider are neceesary to form a cord equal to that of the silk-worm; and as it would be impossible to apply these so closely together as to avoid leaving any empty spaces, from which the light would not be reflected, the lustre would consequently be considerably less: this was noticed by M. de la Hire at the time the stockings were presented to the society. It was farther observed, that spiders afford less silk than silk-worms, the largest bags of the latter weighing four grains, the smaller three grains,—so that 2,304 worms produce a pound of silk. The bags of a spider weigh about one grain; when cleared of the dust and filth, they lose about two-thirds of that weight. The work of twelve spiders, therefore, only equals that of one silk-worm; and a pound of silk will require, at least, 27,648 spiders. But as the bags are solely the work of the females, who spin them to deposit their eggs in, there must be kept 55,296 spiders to yield one pound of silk; and this will apply to the good ones alone, the spiders in gardens barely yielding a twelfth part of the silk of the domestic kinds. Two hundred and eighty of them would not produce more than one silk-worm; and 663,555 such spiders would scarcely yield a pound of silk!

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Walking Blindfolded.

The difficulty of walking to any given point blindfolded, can only be conceived by those who have made the experiment. After wandering about in every possible direction, now east, now west; at one time forward, at another time backward; working for a while at the zigzag, then shooting out like an arrow from a bow; and not unfrequently describing a complete circle like a miller's horse; the party is generally a thousand times more likely to end his travels at the spot from which he set out, than at the spot to which he wished to go. The following authentic achievment presents as extraordinary an exception to the general experience on this head, as perhaps ever occurred.

Dennis Hendrick, a stone mason, for a wager of ten guineas, walked from the Exchange in Liverpool, along Deal-street to the corner of Byrom-street (being a distance of three quarters of a mile), blindfolded, and rolling a coach
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wheel. On starting, there were two plaisters of Burgundy pitch put on his eyes, and a handkerchief tied over them, to prevent all possibility of his seeing. He started precisely at half-past seven in the morning, and completed his undertaking at twenty minutes past eight, being in fifty minutes.

* * *

Remarkable Epitaph.

At the entrance of the church of San Salvador, in the city of Oviedo, in Spain, is a most remarkable tomb, erected by a prince named *Silo*, with a very curious Latin inscription, which may be read two hundred and seventy ways, by beginning with the capital S in the centre.

Silo Princeps Fecit.

T I C E F S P E C N C E P S F E C I T
I C E F S P E C N I N C E P S F E C I
C E F S P E C N I R I N C E P S F E C
E F S P E C N I R P R I N C E P S F E
F S P E C N I R P O P R I N C E P S F
S P E C N I R P O L O P R I N C E P S
P E C N I R P O L I L O P R I N C E P
E C N I R P O L I S I L O P R I N C E
P E C N I R P O L I L O P R I N C E P
S P E C N I R P O L O P R I N C E P S
F S P E C N I R P O P R I N C E P S F
E F S P E C N I R P R I N C E P S F E
C E F S P E C N I R I N C E P S F E C
I C E F S P E C N I N C E P S F E C I
T I C E F S P E C N C E P S F E C I T

On the tomb are inscribed these letters:
A. S. E. S. S. T. T. L.
Which are the initials of the following Latin words:
Hic situs est Silo, sit tibi terra levis.
In English.
"Here lies Silo. May the earth lay light on him."

Newspapers.

Mr. Chalmers observes, that it may gratify our national pride, to be told, that to the wisdom of Elizabeth, and the prudence of Burleigh, we owe the introduction of newspapers. The first was called *The English Mercurie*, and was printed during the Spanish Armada: it is still preserved in the British Museum, being dated July 23, 1588. From 1588 to 1622, few of these publications appeared; but the victories of Gustavus Adolphus having excited the curiosity of our countrymen, a weekly paper, called *The News of the present Week*, was printed. After some time, this was continued under another title, and ultimately it was succeeded by *The German and Swedish Intelligencer*. These papers were originally issued in the shape of small pamphlets, and continued so till 1661, when Sir Robert l'Estrange published *The Public Intelligencer*, in the present shape of newspapers. *The London Gazette* was published in 1665, under the title of *The Oxford Gazette*, it having been printed at Oxford during a Session of Parliament held there, on account of the plague then raging in London; and from this period, it is curious to trace the progression and increase of these interesting vehicles of information. From 1661 to 1688, no less than seventy papers were published under different titles. After the Revolution, *The Orange Intelligencer* appeared; and thence to 1692, there were twenty-six different others brought forward. From an advertisement in *The Athenian Gazette* of 1696, it appears, that the coffee-houses in London were then supplied with nine newspapers every week, exclusive of votes of Parliament, but there is no mention of any one printed daily. In 1689, eighteen papers were published, of which only *The London Courant* was a daily paper. In 1724, the number was three daily, six weekly, and three new evening papers, every week. In 1815, the number of newspapers in Great Britain and Ireland had risen to 252. Of these, fifty-five were published in London; fifteen daily, and forty periodically; 122 in the country parts of England, 26 in Scotland, and 49 in Ireland.

The total number of copies of these papers, printed during three months, ending the first of February, 1815, was

5,890,621; making the annual average about *twenty-two millions seven hundred and sixty-two thousand, seven hundred and sixty-four!!*

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A rare circle of Friends.

SIR HENRY BLACKMAN, of Lewes, on being knighted in 1782, gave a dinner to sixteen friends, with an invitation to them to dine with him annually for forty years; four of them died during the first four years, but twenty-eight years rolled round before another seat became vacant at the festive board. In 1814 two died, aged between eighty and ninety; so that ten remained of the original number at the thirty-third anniversary, held in July, 1815!

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Modern Patriarch.

HUFELAND, in his Art of prolonging Life, says: "The most extraordinary instances of longevity are to be found among those classes of mankind who, amidst bodily labour, and in the open air, lead a simple life, agreeably to nature; such as farmers, gardiners, hunters, soldiers, and sailors. In these situations, man still attains to the age of 140, and even 160." He then enumerates several persons who attained a great age, among whom are Henry Jenkins and Thomas Parr; the former of whom, at the time of his death, was 169 years old, and the latter upwards of 152; Draakenburg, the Dane, who died in 1772, in the 146th year of his age; J. Effingham, who died in Cornwall, in the 144th, and the old Prussian soldier, Mittlestedt, who died in 1792, in the 112th year of his age. These are some of the most remarkable instances given by Dr. Hufeland; but in turning over a Dutch dictionary, "Het Algemeen historisch; geographisch en genealogisch Woordenboek," by Luiscius, we have found the following still more extraordinary instance of a man who attained the age of 180. As it is little known, we have translated the whole article from the above work. "Czartan (Petrarch), by religion a Greek, was born in the year 1539, and died on the 5th of

January, 1724, at Kofrosch, a village four miles from Temeswar, on the road leading to Karansebes. He had lived, therefore, a hundred and eighty years. At the time when the Turks took Temeswar from the Christians, he was employed in keeping his father's cattle. A few days before his death, he had walked, with the help of a stick, to the post-house at Kosfrosch, to ask charity from the travellers. His eyes were much inflamed, but he still enjoyed a little sight. His hair and beard were of a greenish white colour, like mouldy bread; and he had a few of his teeth remaining. His son, who was ninety-seven years of age, declared his father had once been the head taller; that at a great age he married for the third time; and that he was born in this last marriage. He was accustomed, agreeably to the rules of his religion, to observe fast days with great strictness, and never to use any other food than milk, and certain cakes, called by the Hungarians *hollatschen*, together with a good glass of brandy, such as is made in the country. He had descendants in the fifth generation, with whom he sometimes sported, carrying them in his arms. His son, though ninety-seven, was still fresh and vigorous. When field marshal Count Wallis, the commandant of Temeswar, heard that this old man was taken sick, he caused a portrait of him to be painted, and when it was almost finished, he expired. This account is extracted from a letter, dated January the 29th, 1724; and written by Hamelbranix, the Dutch envoy, at Vienna, to their High Mightinesses, the States General."

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Singular Intermarriage.

A Mr. Harwood had two daughters by his first wife, the eldest of whom was married to John Coshick; this Coshick had a daughter by his first wife, whom old Harwood married, and by her had a son; therefore, John Coshick's second wife could say as follows:

My father is my son, and I am my mother's mother;
My sister is my daughter, and I'm grandmother to my brother.

* * *

Longevity of Artists.

An incessant devotion to the arts and sciences is often supposed to be unfavourable both to health and longevity, The following lists of the ages of several famous musicians and sculptors, will shew how very unfounded this supposition is.

AGES OF CERTAIN EMINENT MUSICIANS.

Tallis	85
Bird	80
Child	90
Wilson	79
Turner	88
Holder	82
Creighton and Burridge	90
Pepusch	85
Handel	75
Arne	74
Stanley	70
Boyce	89
Harriugton	89
Burney	86
Randall	80
Paesiello	84
Castrucci	80
Tartoni	78
Guglielmi	76
Geminianæ	82
Hays	80
Cervetto	104

AGES OF CELEBRATED SCULPTORS.

Michael Angelo	90
Bernini	82
Donatello	83
Puget	73
Tubi	70
G. de Pologna	84
Ghiberti	83

Bardinelli	72
Sarazin	70
St. Guilliard	77
Giradon	85
Coyswox	80
Le Fautre	84
Vauclève	87
M. Anguin	85
F. Angwir	76
Coston	75
Le Moyne	74
Adam	77
Rhysbrack	75
Reynauldin	79

Among these names will be found some of the most laborious and remarkable of those who have devoted their lives to either of these arts.

* * *

Signs of the Weather.

Signs of Rain, from Birds.—Sea and fresh water-fowls, such as cormorants, sea-gulls, moor-hens, &c. flying from sea, or the fresh waters to land, shew bad weather at hand; land-fowls flying to waters, and those shaking, washing, and noisy, especially in the evening, denote the same; geese, ducks, coots, &c. picking, shaking, washing, and noisy; rooks and crows in flocks, and suddenly disappearing; pyes and jays in flocks, and very noisy; the raven or hooded crow crying in the morning, with an interruption in its notes, or crows being very clamorous at evening; the heron, bittern, and swallow, flying low; birds forsaking their food and flying to their nests; poultry going to roost, or pigeons to their dove-house; small birds seeming to duck, and wash in the sand; the late and early crowing of the cock, and clapping his wings; the early singing of wood-larks; the early chirping of sparrows; the early note of the chaffinch near houses; the dull appearance of robin-red-breasts near houses; peacocks and owls unusually clamorous.

Of Wind, from Birds.—Sea and fresh water fowls gathering in flocks to the banks, and there sporting, especially in the morning; wild geese flying high, and in flocks, and directing their course eastward; coots restless and clamorous; the hoopoe loud in his note; the king's-fisher taking to land; rooks darting and shooting in the air, or sporting on the banks of fresh waters; and lastly, the appearance of the malefigie at sea, is a certain forerunner of violent winds, and (early in the morning) denotes horrible tempests at land.

Of Fair Weather, from Birds.—Halcyons, sea-ducks, &c. leaving the land, and flocking to the sea, kites, heron, bitterns, and swallows flying high, and loud in their notes; lapwings restless and clamorous; sparrows, after sunrise, restless and noisy; ravens, hawks, and kestrils, (in the morning) loud in their notes; robin-red-breast mounted high, and loud in his song; larks soaring high and loud in their songs; owls hooting with an easy and clear note; bats appearing early in the evening.

Of Rain, from Beasts.—Asses braying more frequently than usual; hogs playing, scattering their food, or carrying straw in their mouths; oxen snuffing the air, looking to the south, while lying on their right sides, or licking their hoofs; cattle gasping for air at noon; calves running violently and gamboling; deer, sheep, or goats, leaping, fighting, or pushing; cats washing their face and ears; dogs eagerly scraping up earth; foxes barking; rats and mice more restless than usual; a grumbling noise in the belly of hounds.

Of Rain, from Insects.—Worms crawling out of the earth in great abundance; spiders falling from their webs; flies dull and restless; ants hastening to their nests; bees hastening home, and keeping close in their hives; frogs drawing nigh to houses, and croaking from ditches; gnats singing more than usual; but if gnats play in the open air, or if hornets, wasps, and glow-worms appear plentifully in the evening, or if spiders' webs are seen in the air, or on the grass: all these denote fair and warm weather at hand.

Of Rain, from the Sun.—Sun rising dim or waterish; rising red with blackish beams mixed along with his rays;

rising in a musty or muddy colour; rising red and turning blackish; setting under a thick cloud; setting with a red sky in the east.

Sudden rains never last long; but when the air grows thick by degrees, and the sun, moon, and stars shine dimmer and dimmer, then it is like to rain six hours usually.

Of Wind, from the Sun.—Sun rising pale and setting red, with an iris; rising large in surface; rising with a red sky in the north; setting of a blood-colour; setting pale, with one or more dark circles, or accompanied with red streaks; seeming concave or hollow; seeming divided, great storms; parhelia, or mock suns, never appear, but are followed by tempest.

Of Fair Weather, from the Sun.—Sun rising clear, having set clear the night before; rising while the clouds about him are driving to the west; rising with an iris around him, and that iris wearing away equally on all sides, then expect fair and settled weather; rising clear and not hot; setting in red clouds, according to the old observation:

> The evening red and morning grey
> Are the sure signs of a fair day.

* * *

Choosing a King.

The Tyrians having been much weakened by long wars with the Persians, their slaves rose in a body, slew their masters and their children, and then seized on their houses and wives whom they married. The slaves having thus got possession of all, consulted about the choice of a king, and agreed that he who could first discern the sun rise should be king. One of them, being more merciful than the rest, had, in the general massacre, spared his master Straton, and his son, whom he hid in a cave, and to his old master he now resorted for his advice as to his competition. What was Straton's advice?

Straton advised his slave, that when others looked to the east he should look towards the west. Accordingly, when the rebel tribe had all assembled in the fields, and every man's eyes were fixed upon the east, Straton's slave, turning his back upon the rest, looked only westward. He was scoffed at by every one for his absurdity, but immediately he espied the sunbeams upon the high towers and chimneys in the city, and announcing the discovery, claimed the crown as his reward.

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Remarkable Equestrian Expeditions.

MR. COOPER THORNHILL, an innkeeper at Stilton, in Huntingdonshire, rode from that place to London and back again, and also a second time to London, in one day, which made a journey in all 213 miles. He undertook to ride this journey with several horses in 15 hours, but performed it in 12 hours and a quarter. This remarkable feat gave rise to a poem called the Stilton Hero, which was published in the year 1745.

Some years ago, Lord James Cavendish rode from Hyde Park Corner to Windsor Lodge, which is upwards of twenty miles, in less than an hour.

Sir Robert Carey rode nearly 300 miles in less than three days, when he went from London to Edinburgh to inform king James of the death of queen Elizabeth. He had several falls and sore bruises on the road, which occasioned his going battered and bloody into the royal presence.

On the 3d of May, 1758, a young lady, who, at Newmarket, had laid a considerable wager, that she could ride a thousand miles in 1000 hours, finished her match in little more than two-thirds of the time. At her coming in, the country people strewed flowers in her way.

On the 29th of August, 1750, was decided at Newmarket a remarkable wager for 1000 guineas, laid by Theobald Taff, Esq. against the Earl of March and Lord Eglinton, who were to provide a four wheel carriage with a man in it, to be drawn by four horses 19 miles in an hour. The match was performed in 53 minutes and 24 seconds. An engraved model of the carriage used to be sold in the print shops.

The celebrated Marquis de la Fayette, rode, in August 1778, from Rhode Island to Boston, nearly 70 miles distant, in seven hours, and returned in six and a half.

Mr. Fozard, of Park Lane, London, for a wager of £150 against £100, undertook to ride 40 miles in two hours,
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over Epsom course. He rode two miles more than had been agreed on, and performed it in five minutes under time, in October 1789.

Mr. Wilde, an Irish gentlemen, lately rode 127 miles on the course of Kildare, in Ireland, in six hours and twenty minutes, for a wager of 1000 guineas.

The famous Count de Montgomery escaped from the massacre of Paris in 1572, through the swiftness of his horse, which, according to a manuscript at that time, carried him 30 leagues, or 90 miles, without halting.

* * *

TABLE,

SHEWING THE VELOCITY OF THE WIND IN DIFFERENT CIRCUMSTANCES.

Miles per Hour.	Feet per Second.	Perpendicular force on Square Foot, in Avoirdupoise Pounds and Parts.	
1	1·47	·005	Hardly perceptible.
2	2·93	·020	
3	4·4	·044	Just perceptible.
4	5·87	·079	Gently pleasant.
5	7·33	·123	
10	14·67	·492	Pleasant brisk.
15	22·	1·107	
20	29·34	1·968	Very brisk.
25	36·67	3·075	
30	44·01	4·429	High wind.
35	51·34	6·027	
40	58·68	7·873	Very high wind.
45	66·01	9·963	
50	73·35	12·300	Storm or tempest.
60	88·02	17·715	Great storm.
80	117·36	31·490	Hurricane.
100	146·7	49·200	Hurricane, that tears up trees and carries buildings before it.

Antediluvian Patriarchs.

Adam lived	930	years.
Seth	912	do.
Enos	905	do.
Canaan	910	do.
Mahalaleel	895	do.
Jared	962	do.
Enoch	365	do.
Methusalem	969	do.
Lamech	777	do.
Noah, who lived before and after the Deluge, in all	950	do.

* * *

The Unicorn.

THE existence of such an animal as the unicorn has long been considered as purely fabulous, but very recent accounts seem to leave no doubt of its reality. A Major Latter, commanding in the Rajah of Sikkim's territories in the hilly country, East of Nepauk, in a communication addressed to Adjutant-General Nicol, and transmitted by him to the Marquis of Hastings, expressly states, that the unicorn exists at this moment, in the interior of Thibet, where it is well known to the inhabitants. "This (we copy from the Major's letter,) "is a very curious fact, and it may be necessary to mention how the circumstance became known to me. In a Thibetian manuscript containing the names of different animals, procured the other day from the hills, the *unicorn* is classed under the head of those whose hoofs are divided; it is called the one-horned *tso'po.* Upon enquiring what kind of animal it was, to our astonishment, the person who brought the manuscript described exactly the unicorn of the ancients; saying, that it was a native of the interior of Thibet, about the size of a *tàttoo,* a horse from 12 to 13 hands high,) fierce and extremely wild; seldom if ever caught alive, but frequently shot; and that the flesh was used for food The person who gave me this information, has repeatedly seen these animals, and eaten the flesh of them. They go together in herds, like our wild buffaloes, and are frequently met with on the borders of the Great Desert, about a month's journey from Lassa, in that part of the country inhabited by the wandering Tartars."

This communication is accompanied by a drawing made by the messenger from recollection; it bears some resemblance to a horse, but has cloven hoofs, a long curved horn growing out of the forehead, and a boar-shaped tail, like that of the "*fera menoceros,*" described by Pliny. From its herding together, as the unicorn in Scriptures is said to do, as well as from the rest of the description, it is evident that it cannot be the rhinoceros, which is a solitary animal; besides, Major Latter states, that, in the Thibetian manuscript, the rhinoceros is described under the name of *serva,* and classed with the elephant; " neither," says he, " is it the wild horse (well known in Thibet), for that has also a different name, and is classed in the MS. with the animals which have the hoof undivided." " I have written, (he subjoins) to the Sachia Lama, requesting him to procure me a perfect skin of the animal, with the head, horns, and hoofs; but it will be a long time before I can get it down, for they are not to be met with nearer than a month's journey from Lassa."

* * *

Magic Square of Squares.

THE Magic Square of Squares, exhibited in Plate VIII. is found by dividing the great square into 256 small squares, in which all the numbers from 1 to 256 are placed in 16 columns, which may be taken either horizontally or vertically. The properties are as follow:

1. The sum of sixteen numbers in each column, vertical and horizontal, is 2056.
2. Every half column, vertical and horizontal, makes 1028, or half of 2056.
3. Half a diagonal ascending, added to half a diagonal descending, makes 2056; taking these half diagonals from

the ends of any sides of the square to the middle thereof, and so reckoning them either upward or downward, or sideways, from left to right hand, or from right to left.

4. The same, with all the parallels to the half diagonals, as many as can be drawn in the great square; for, any two of them being directed upward and downward, from the place where they begin, to that where they end, their sums will make 2056. The same downward and upward in like manner: or all the same, if taken sideways to the middle, and back to the same side again.—N.B. one set of these half diagonals and their parallels is drawn in the same square, upward and downward. Another such set may be drawn from any of the other three sides.

5. The four corner numbers in the great square, added to the four central numbers therein, make 1028; equal to the half sum of any vertical or horizontal column, which contains sixteen numbers; and equal to half a diagonal or its parallel.

6. If a square hole (equal in breadth to four of the little squares) be cut in paper, through which any of the 16 little squares in the great square may be seen, and the paper be laid on the great square, the sum of all the 16 numbers, seen through the hole, will be equal to the sum of the 16 numbers in any horizontal or vertical column, viz. to 2056.

Brevity of Life.

An ancient register, which may be depended upon, gives us the following very mortifying instances of the brevity of human life, of a hundred persons, who were born at the same time.

At the end of six years, there remained only..	64
At the end of sixteen years	46
At the end of twenty-six years	26
At the end of thirty-six years..............	16
At the end of forty-six years	10
At the end of fifty-six years................	6
At the end of sixty-six years	3
At the end of seventy-six years	1

The Month of April.

The month of April has been remarkable for its fatality to celebrated women.

Petrarch's Laura, died on the 6th of April.
Diana of Poictiers, on the 26th.
Queen Elizabeth of England, the 3d.
Christina Queen of Sweden, the 19th.
Gabrielle d'Estrées, the 9th.
Mademoiselle de Montpensier, the 5th.
Madame de Sevigné, the 14th.
Madame de Maintenon, the 15th.
Madame de Caylus, the 15th.
Madame de Pompadour, the 15th.
Judith Queen of France, the 19th.
Jeanne de Navarre, the 2d.

* * *

Numerical Coincidences.

The marriage of Louis XIII. of France, with the Princess Ann of Austria, met with many obstacles, but was ultimately brought about in consequence of the following *weighty* considerations.

The name of Louis, or according to the ancient orthography, *Loys* de Bourbon, contained thirteen letters; he was in the thirteenth year of his age; and he was the thirteenth King of France of the name of Louis. The Princess Anne d'Autriche had also thirteen letters in her name; she too was in her thirteenth year; and there were thirteen princesses of the same name in the house of Spain. Nay, more, Louis and Anne were born on the same day, of the same month, of the same year. In short, nothing could be more obvious than that they were born for each other!

Nothing was more common in former times than such puerile combinations of circumstances. Similar to the above was the play on the number fourteen, as connected with the life of Henry the Fourth. He was born in the fourteenth century, fourteen years and fourteen decades after Jesus Christ; he came into the world on the 14th of

December, and left it on the 14th of May; he lived four times fourteen years, four times fourteen days, and fourteen weeks; and there were fourteen letters in his name, Henri de Bourbon.

* * *

To use the Sun-dial as a Moon-dial.

If any one wishes, out of curiosity or necessity, to learn what the hour is by the moon, he may calculate it by the shadow which the moon casts upon the sun-dial; only it is necessary to know the moon's age, which may be found in the almanack. If the new moon happen in the morning, the present day is taken into the account; but, if it happen after noon, the following day is counted the first. The moon's age is to be multiplied by four and divided by five; the quotient must be either added to the hours which the shadow indicates on the sun-dial, and the sum gives the time sought, or the hour shewn by the moon upon the dial is subtracted from the quotient, and the remainder gives the hour sought. The first is to be done when the shadow falls on an hour of the afternoon, and the latter when it falls upon an hour of the forenoon. The following examples will illustrate this.

1st. Suppose a countryman returns home in the evening, the moon being ten days old, and finds that the shade cast by the moon on the sun-dial is half-past two, or that the shadow cast by the moon falls on the place at which the shadow cast by the sun stands at half past two. The question is, what o'clock was it when the peasant came home? The answer is calculated as follows:

The moon's age 10 days + 4 = 40, which, divided by 5, produces 8. The time, therefore, is 8 when the moon was in the meridian, and 8 + 2½ = 10½, or half past ten, the hour sought.

2d. Suppose the moon to have been 18 days old, and the shadow cast by it on the sun-dial to have marked 11. This time is subtracted from the hour when the moon was in the meridian; thus, moon's age 18 days + 4 = 72, which, divided by 5, produces 14⅖, or 2 hours 24 minutes past midnight, at which time the moon was in the meridian on that day, and from which tne hour marked by the shadow must be deducted. The shadow shews here 11 o'clock in the forenoon, or one hour before noon, which deducted from 2 hours 24 minutes, gives 1 hour 24 minutes past 1 o'clock.

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Diving Bell.

To obviate the inconveniences of diving, to those who have not the fabled power of a Nicholas, different instruments have been contrived. The chief of these is the diving bell, which is most conveniently made in the form of a truncated cone, the smaller base being closed and the larger open. It is to be poised with lead, and so suspended that the vessel may sink full of air with its open end downwards, and as near as may be in a situation parallel to the horizon, so as to close with the surface of the water all at once. Under this covercle, the diver, sitting, sinks down with the included air to the depth desired. Dr. Halley contrived some additions to the apparatus, whereby not only to recruit and refresh the air from time to time, but also to keep the water wholly out of it at any depth. The manner in which this was effected he relates in the following words:

"The bell I made use of was of wood, containing about sixty cubic feet in its concavity, and was of the form of a truncated cone, whose diameter at the top was three feet, and at the bottom five. This I coated with lead so heavy that it would sink empty; and I so distributed the weight about its bottom that it would go down in a perpendicular direction, and no other. In the top I fixed a strong but clear glass as a window to let in the light from above, and likewise a cock to let out the air that had been breathed; and below, about a yard under the bell, I placed a stage which hung by three ropes, each of which was charged with about one hundred weight to keep it steady. This machine I suspended from the mast of a ship by a sprit, which was sufficiently secured by stays to the mast head, and was directed by braces to carry it overboard clear of the ship's side, and to bring it again within board as occasion required.

200	217	232	249	8	25	40	57	72	89	104	121	136	153	168	185
58	39	26	7	250	231	218	199	186	167	154	135	122	103	90	71
198	219	230	251	6	27	38	59	70	91	102	123	134	155	166	187
60	37	28	5	252	229	220	197	168	165	156	133	124	101	92	69
201	216	233	248	9	24	41	56	73	88	105	120	137	152	169	184
55	42	23	10	247	234	215	202	183	170	151	138	119	106	67	74
203	214	235	246	11	22	43	54	75	86	107	118	139	150	171	182
53	44	21	12	245	236	213	204	181	172	149	140	117	108	85	76
205	212	237	244	13	20	45	52	77	84	109	116	141	148	173	180
51	46	19	14	243	238	211	206	179	174	147	142	115	110	83	78
207	210	239	242	15	18	47	50	79	82	111	114	143	146	175	178
49	48	17	16	241	240	209	208	177	176	145	144	113	112	81	80
196	221	228	253	4	29	36	61	68	93	100	125	132	157	164	189
62	35	30	3	254	227	222	195	190	163	158	131	126	89	94	67
194	223	226	255	2	31	34	63	66	95	98	127	130	159	162	191
64	33	32	1	256	225	224	193	192	161	160	129	128	97	96	65

GRAND MAGIC SQUARE OF SQUARES.

Published May 1821, by T. Boys; 7 Ludgate Hill.

"To supply air to this bell when under water, I caused a couple of barrels of about thirty-six gallons each, to be cased with lead, so as to sink empty; each of them having a bung-hole in its lowest part, to let in the water as the air in them condensed in their descent, and to let it out again when they were drawn up full from below. And to a hole in the uppermost part of these barrels I fixed a leathern trunk or hose, well liquored with bees'-wax and oil, and long enough to fall below the bung-hole, being kept down by a weight appended, so that the weight in the upper part of the barrels could not escape, unless the lower ends of these hose were first lifted up.

"The air barrels being thus prepared, I fitted them with tackle proper to make them rise and fall alternately, after the manner of two buckets in a well, which was done with so much ease, that two men with less than half their strength could perform all the labour required; and in their descent they were directed by lines fastened to the under edge of the bell, which passed through rings on both sides the leathern hose in each barrel, so that sliding down by these lines they came readily to the hand of a man who stood on the stage on purpose to receive them, and to take up the ends of the hose into the bell. Through these hose, as soon as their ends came above the surface of the water in the barrels, all the air that was included in the upper parts of them was blown with great force into the bell, whilst the water entered at the bung-holes below, and filled them; and as soon as the air of one barrel had been thus received, upon a signal given, that was drawn up, and at the same time the other descended; and, by an alternate succession, furnished air so quick, and in so great plenty, that I myself have been one of five who have been together at the bottom in nine or ten fathom water, for above an hour and a half at a time, without any sort of ill consequences; and I might have continued there as long as I pleased, for any thing that appeared to the contrary. Besides, the whole cavity of the bell was kept entirely free from water, so that I sat on a bench which was diametrically placed near the bottom, wholly dressed, with all my clothes on. I only observed that it was necessary to let down gradually at first, at about twelve feet at a time, and then to stop, and drive out the air

An extract from Mr. Spalding's account of his submarine excursions, may prove interesting to the reader.

"Having a large concern in the cargo of the Peggy, Thomas Boswell, master, from London to Leith, with a very full and valuable loading; this vessel, with two large ships belonging to Newcastle and Shields, were, in a severe storm, wrecked on the Scares, or Fern Islands, in the night of the 3d or morning of the 4th of December, 1774, when all the crew and passengers perished; the light goods thrown on shore from Sunderland Point to Holy Island, gave the first intelligence of our loss.

"At several meetings of the traders, I was unanimously requested to take the management of this business, and collect what could be recovered of the cargo and vessel. This, to the utmost of my power, at that severe season of the year, I performed, but never found any part of my own property.

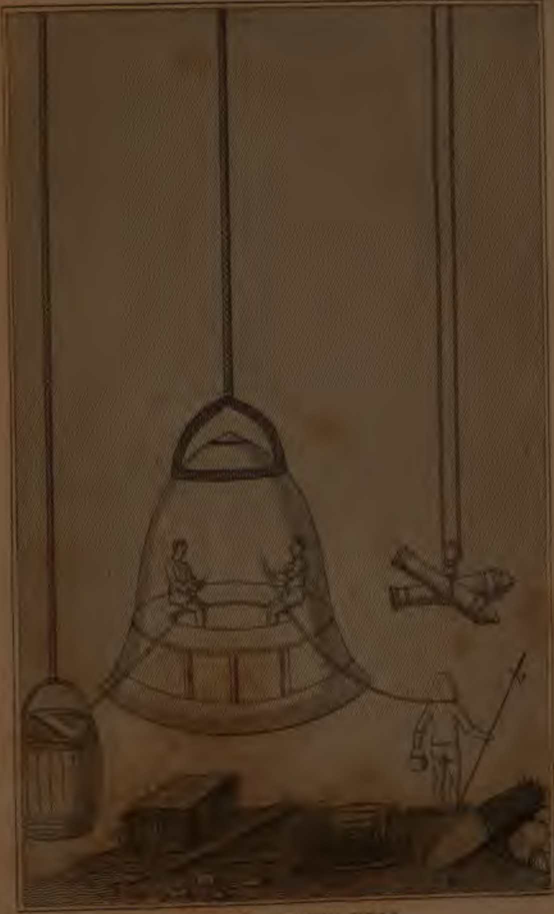
"On this occasion the utility of Dr. Halley's diving-bell occurred to me in the strongest manner; particularly as I thought I had discovered the place where it might reasonably be presumed the bottom of our vessel lay, depressed in the water by the heavy goods usually stowed in the lower tiers.

"At my return to Edinburgh, I consulted every author I could find, on the subject of diving, and the diving-bell; and in June last made repeated trials in the Roads of Leith, in various depths of five, six, and eight fathoms water, making several alterations which experience suggested.

"Having favourable weather, I sailed to the Scares with my brother and three sailors I had brought with me from Leith; also two pilots from Bamborough and Warren.

"By the calmness of the weather, it was four in the afternoon, about high water, before I could go down, at a small distance from the place where I judged the wreck to lie: the depth was about ten fathoms. I happily alighted on a flat part of the rock, within a small space of a dreadful chasm, and had just gone two steps with my machine, when the terror of the two pilots was so great, that, in spite of my brother, they brought me up very precipitately, before

Plate IX to [illegible]



HALLEY'S DIVING BELL.

[illegible]

I had in any degree examined around me. On coming into the boat, they remonstrated on the danger of the machine being overturned, either on the wreck or the rocks, and also on the impossibility of raising any of the weighty goods with so small a purchase, in an open boat, where, at this season, no large vessel would venture to lie, as the nights were now so long, and only two passages for a small vessel to run through, in case of a gale of easterly or southerly wind; one of the passages extremely narrow, and both of them dangerous. As the tide now ran in the face of the rock we lay at, the pilots would not consent to lie at anchor any longer; lest wind and tide being both contrary, they should not be able to conduct us safely through the islands before it was dark.

"I was obliged to comply, very unwillingly, with their intreaties; though part of their assertions came too truly to pass; for, in sailing home, we cleared the rocks and islands with difficulty, but not before eleven o'clock at night, and even then with hard labour.

"Convinced, from this, that with an open boat nothing could be accomplished to purpose, and except in June and July, no man would risk himself with me in a sloop, to continue a few days and nights at anchor there; I was obliged to abandon this ultimate aim of all my attempts: yet, though my boat was too small to raise any great weight, I determined to take a view of the guns of a Dutch ship of war lost in the year 1704, and as they lay two or three miles nearer the land, I could execute this design with less difficulty, especially as the weather continued still favourable. Having procured all intelligence possible, we went to the place; and, being joined by Mr. Blacket, tacksman of the islands, his son, and several other brave fellows, (my two pilots, though still with me, having no stomach for the service,) I went down four different times, but could find no marks of any wreck, notwithstanding my walking about in five or six fathoms water, as far as it was thought safe to allow rope to the bell; continuing generally twenty minutes or more each time, at the bottom. On this occasion I was obliged to carry a cutting-hook and knife, to clear away the sea-weeds, which at this place are very thick and strong; without this method I could not move about. At the fifth going down, each trial being in a different place, I was agreeably surprised to find a large grove of tall weeds, all of them from six to eight feet high, with large tufted tops, mostly growing in regular ranges, as far as the eye could reach; a variety of small lobsters, and other shell-fish, swimming about at intervals.

"On a survey of the ground, I found myself on the extremity of the place where the long looked-for cannon lay, and one very large piece was nearly covered with round stones, thrown upon it by storms from the south-east. By the appearance and sound, I judged it to be iron; but, to form a more certain idea, I tried to pull up a strong weed, expecting some part of the rust, if iron, would adhere to the fibres of the root; but my strength was now exhausted almost to faintness, by such violent exertions in moving about during a space of nearly three hours; yet still I determined, if possible, to have this weed. I twisted the bushy top round one of the hooks at the mouth of the bell, on which part of the weight for sinking the machine hung; then, giving the signal, brought the weed along with me. To one side of the root was fastened a piece of rock, about seven pounds weight; in the middle, a piece of decayed oak, very black; on the other side, a black substance, which, on a few hours' exposure to the air, changed into a dull reddish colour, resembling crocus martis.

"Pressing business requiring me at home the Monday following, I set sail for Leith; our compass being attracted by the great quantity of iron-work in my boat, we were, during the night, in the greatest danger, being twice entangled amongst the rocks, and very much chilled with the cold, for the want of proper cover: but, escaping these dangers, we next morning safely arrived at Leith."

The diving bell was employed in several great undertakings, as far back as the end of the sixteenth century. When the English, in 1558, dispersed the Spanish fleet, called the invincible Armada, part of the ships went to the bottom near the Isle of Mull, on the western coast of Scotland; and some of these, according to the accounts of the Spanish prisoners, contained great riches. This report excited from time to time the avarice of speculators, and gave rise to several attempts to procure part of the lost treasure. In the year 1665, a person was so fortunate as to bring up some cannon, which were not however of sufficient value to defray the expences. In the year 1680, William Phipps, a native of America, formed a project for searching and unloading a rich Spanish ship sunk on the coast of Hispaniola, and presented his plan in such a plausible manner, that king Charles II. gave him a ship, and furnished him with every thing necessary for the undertaking. He set sail in the year 1683, but, being unsuccessful, returned again in great poverty, though with a firm conviction of the practicability of his scheme. By a subscription, promoted chiefly by the Duke of Albermarle, the son of the celebrated Gen. Monk, Phipps was enabled in 1678 to try his fortune once more, having previously engaged to divide the profit according to the twenty shares of which the subscription consisted. At first, all his labour proved fruitless; but, at last, when his patience was almost entirely exhausted, he was so lucky as to bring up from the depth of from six to seven fathoms so much treasure, that he returned to England with the value of two hundred thousand pounds sterling. Of this sum, he himself got about sixteen, others say twenty thousand; and the Duke, ninety thousand pounds. After he came back, some persons endeavoured to persuade the King to seize both the ship and the cargo, under a pretence that Phipps, when he solicited for his Majesty's permission, had not given accurate information respecting the business. But the King answered, with much greatness of mind, that he knew Phipps to be an honest man, and that he and his friends should share the whole among them, had he returned with double the value. His Majesty even conferred upon him the honour of knighthood, to shew how much he was satisfied with his conduct; and from Sir William Phipps originated the present noble family of Musgrave.

In consequence of this successful adventure, the Duke of Albermarle obtained the governorship of Jamaica, in order to try his fortune with other ships sunk in that neighbourhood, but nothing was found on this occasion to repay the labour of searching.

In England, however, several companies were formed, and obtained exclusive privileges for fishing up goods on certain coasts by means of divers. The most considerable of these was that which, in 1688, tried its success at the Isle of Mull; at the head of which was the Earl of Argyle. The divers went down to the depth of sixty feet under water, remained there sometimes a whole hour, and brought up gold chains, money, and other articles; which, however, when collected, were of little importance.

The perfection to which the diving-bell has approached was strikingly exhibited, in Plymouth Sound, in the year 1816. One day, Fisher, the diver, after fifteen minutes' absence, brought up with him a stone weighing two hundred pounds, although nearly buried in shells and sand. The anchorage of the sound having been swept from a mass of rock lost from one of the Breakwater vessels in May 1813, and being discovered, the bell vessel was placed over the spot, and the bell lowered with Fisher and two other men, and proper implements for boring in thirty-three feet of water. The men succeeded in penetrating the stone, and making fast the means for heaving it up; all which was safely effected in about two hours and a half from the time of descending. The rock thus recovered weighed four tons, and an entire summer had been spent in trying to get it up, but ineffectually, owing to the peculiarity in its form which precluded sweeping.

A lady of the name of Morris, wife of Major Morris, had lately the courage to descend in the diving-bell at Plymouth, and was probably the first of her sex who has penetrated into the "dark unfathomed caves of ocean." On this occasion, whilst under the water, she wrote a note to her father, which concluded with the following wittily appropriate lines:

From a *Belle*, my dear Father, you've oft had a line,
 But not from a *Bell* under water;
Just now I can only assure you I'm thine,
 Your dutiful, *diving*, affectionate daughter!

* * *

How to make a Statue speak.

PLACE a concave mirror of tin, or gilt pasteboard of about two feet diameter, as A B (Plate XI.) in a perpendicular direction. The focus of this mirror may be at fifteen or eighteen inches distance from its circumference

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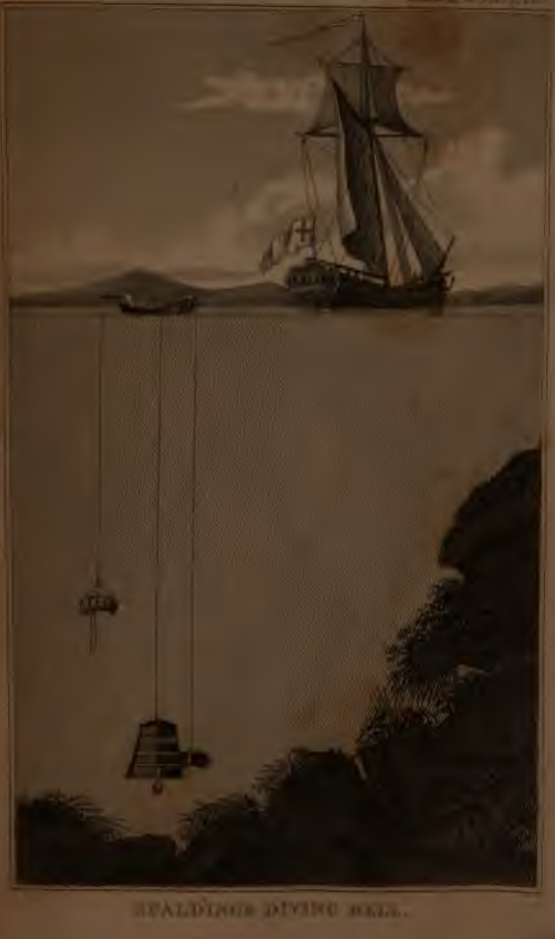

SPALDING'S DIVING BELL.

Published [illegible]

At the distance of about five or six feet, let there be a partition, in which there is an opening (E F) equal to the size of the mirror; against this opening, place a picture printed in water colours on a thin cloth, that sound may easily pass through it. Behind the partition, at the distance of two or three feet, place another mirror (G H) of the same size as the former, and let it be diametrically opposite to it.

At the point C let there be placed the figure of a man seated on a pedestal, and let his ear be situated exactly in the focus of the first mirror; his lower jaw must be made to open by a wire, and shut by a spring; and there may be another wire to move the eyes; these wires must pass through the figure, go under the floor, and come up behind the partition.

Let a person properly instructed be placed behind the partition, near the mirror. You then propose to any one to speak softly to the statue, by putting his mouth to the ear of it, assuring him that it will answer instantly. You then give the preconcerted signal to the person behind the partition, who, by placing his ear to the focus I of the mirror, G H will, by the reflection of the sound, hear distinctly what the other said; and moving the jaws and eyes of the statue by the wires, will return an answer directly; which will, in like manner, be distinctly heard by the first speaker.

The more effectually to conceal the cause of this illusion, the mirror A B may be fixed in the wainscot, and a gauze or any other thin covering thrown over it, as that will not in the least prevent the sound from being reflected.

An experiment of this kind may be performed in a field or garden, between two hedges, in one of which the mirror A B may be placed, and in the other an opening artfully contrived.

This experiment appears to have been derived from the Century of Inventions, by the Marquis of Worcester; whose designs, at the time they were published, were treated with ridicule and neglect, as being impracticable, but are now known to be generally, if not universally, practicable. The words of the Marquis are these: "How to make a brazen or stone head in the midst of a green field or garden, so artificial and natural, that though a man speak ever so softly, and even whisper into the ear thereof, it will presently open its mouth and resolve the question in French, Latin, Welsh, Irish, or English, in good terms; uttering it out of its mouth, and then shutting it, until the next question be asked."

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Ptolemy's Mirror.

We read in several ancient authors, that Ptolemy Euergetes caused to be placed in the tower of the Pharos, at Alexandria, a mirror which represented accurately every thing which was transacted throughout all Egypt, both on water and on land! Some writers affirm, that with this mirror an enemy's fleet could be seen at the distance of 600,000 paces; others say 500 parasangs, or more than 100 leagues!

Abulfeda, in his description of Egypt, says that the mirror was of Chinese iron, and that soon after Mahometanism prevailed, the Christians destroyed it by stratagem.

Buffon thinks that by Chinese iron, Abulfeda meant polished steel; but there seems some plausibility in the conjecture of an acute anonymous writer, (*Phil. Mag.* 1805,) who supposes the metal to have been what is known to us by the name of *tutanag*, a Chinese metallic compound, which might be valued then, as it is now, for the high polish it receives.

The existence of this wonderful mirror has been very generally treated as a fiction. Some celebrated opticians, who have been so far staggered by the positive terms in which the fact stands recorded, as to hesitate about discrediting it entirely, think that, at all events, it could be nothing else than the effect of magic. Such is the opinion of Father Kircher among others, who includes it among "those delusions of the devil, which we should shun with all our might; and, after the example of our holy mother-church, condemn and execrate."

Experience, however, has taught us, that many facts, once reckoned chimerical by a number of learned men, having been better examined by other learned men, have been found not only possible, but in actual existence. Father Abbat, in his *Amusements Philosophiques*, a work first published at Marseilles, in 1763, but now extremely scarce, has a very acute and ingenious dissertation, in which he endeavours to show, that to a certain extent, the fact is in itself "neither impossible nor difficult, but, on the contrary, very probable."

"If this mirror," says Abbat, "existed, it is probable that it was the only one of its kind, and that no other means had been then found of viewing distant objects distinctly. It must, therefore, have been considered as a great wonder in those times, and must have filled with astonishment all who saw its effects. Even though its effects had not been greater than those of a small telescope, it could not fail to be regarded as a prodigy. Hence it is natural to think, that those effects were exaggerated beyond all probability, and even possibility, as commonly happens to rare and admirable machines and inventions. If we abstract then from the accounts of the mirror of Ptolemy, the evident exaggerations of ignorance, nothing will remain, but that at some distance, provided nothing was interposed between the objects and the mirror, those objects were seen more distinctly than with the naked eye; and that with the mirror many objects were seen, which, because of their distance, were imperceptible without it."

Here is nothing but what is both possible and probable; and nobody, we think, after perusing Father Abbat's proofs and illustrations, need blush for their philosophy, in acknowledging a belief in the actual existence of the long reputed fable of Ptolemy's Mirror.

It is certain, that, under some circumstances, objects may be seen at a much greater distance than is generally supposed. For example, it is said, that the Isle of Man is clearly visible from the summit of Ben Lomond, in Scotland, which cannot be less than a direct distance of one hundred and twenty miles. Glas, in his History of the Canary Islands, affirms, that the Peak of Teneriffe is visible at a distance of one hundred and twenty miles on approaching it, and of one hundred and fifty on leaving it; and Brydone, if we recollect rightly, says, that from the summit of Mount Ætna, mountains two hundred miles off may be distinguished. But the most extraordinary fact of the kind we have met with, if it be a fact, is to be found in the Encyclopædia Britannica, article *London*, where we are told that the illumination of the atmosphere by the great fire of London was visible at Jedburgh, in Scotland, three hundred and seventy-three miles distant!

Percy Anecdotes of Science.

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Rocking Stones.

ROCKING stones, or stones of prodigious size, so exactly poised, that they will rock or shake with the smallest force, were known to ancient as well as modern topography. Pliny tells us, that at Harpasa, a town of Asia, there was a rock of such a wonderful nature, that if touched with the finger it would shake, but could not be moved from its place with the whole force of the body. Ptolemy Hepestion mentions a stone near the ocean, which was agitated when struck by the stalk of an asphodel, but could not be removed by a great exertion of force.

In Britain there are many stones of this description. In the parish of St. Leven, Cornwall, there is a promontory called Castle Treryn. On the western side of the middle group, near the top, lies a very large stone, so evenly poised, that any hand may move it from one side to another; yet it is so fixed on its base, that no lever, nor any mechanical force, can remove it from its present situation. It is called the Logan Stone, and is at such a height from the ground, that no person can believe that it was raised to its present position by art.

Other rocking stones are so shaped, and so situated, that there can be no doubt they were erected by human strength. Of this kind, Borlase thinks the great *Quoit*, or *Karn-lehau*, in the parish of Tywidnek, to be. It is thirty-nine feet in circumference, and four feet thick at a medium, and stands on a single pedestal. There is also a remarkable stone of the same kind in the island of St. Agnes, in Scilly. It is poised on a mass of rock, which is 10 feet six inches high, 47 feet round the middle, and touches the ground with no more than half its base. From this the rocking stone rises on one point only, and is so nicely balanced, that two or three men with a pole can move it.
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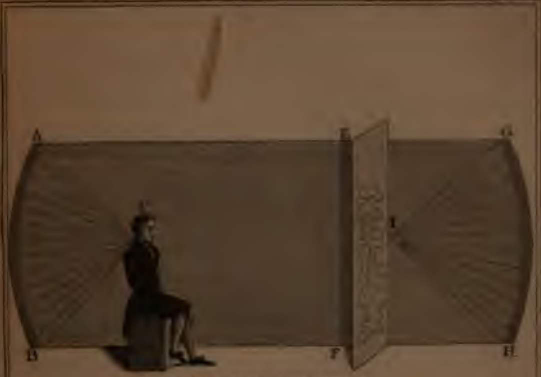
Plates XI & XII to face p.[illegible]



SPEAKING STATUE.

IRON HANGING BRIDGE.

Published [illegible] *Ludgate Hill*

It is eight feet six inches high, and 47 feet in circumference. On the top there is a bason, hollowed out, three feet eleven inches in diameter, at a medium, but wider at the brim, and three feet deep. From the globular shape of this upper stone, it is highly probable that it was rounded by human art, and, perhaps, even placed on its pedestal by human strength.

In Sithney parish, near Helston, in Cornwall, stood the famous *Logan*, or rocking-stone, commonly called *Men Amber*, *Men-au-bar*, or the top stone. It was eleven feet by six long, and four high, and so nicely poised on another stone, that a little child could move it, and all travellers who passed this way desired to see it. But Shrubsall, Cromwell's governor of Pendennis, with much ado, caused it to be undermined, to the great grief of the country. There are some marks of the tool upon it, and, by its quadrangular shape, it was probably dedicated to Mercury.

In the parish of Kirkmichael, in Scotland, there is a very remarkable stone of this description. It stands on a flat-topped eminence, surrounded at some distance by steep rocky hills. It rests on the plane surface of a rock, level with the ground. Its shape is quadrangular, approaching to the figure of a rhombus, of which the greater diagonal is seven feet, and the lesser five. Its medium thickness is about two feet and a half; its solid contents will, therefore, be about 51,075 cubical feet. As it is of very hard and solid whinstone, its weight, reckoning the cubical foot at eight stone three pounds, may be calculated to be 418 stone, five pounds, or within 30 pounds of three tons. It touches the rock on which it rests only in one line, which is in the same plane with the lesser diagonal, and its lower surface is convex towards the extremities of the greater diagonal. By pressing down either of the extreme corners, and withdrawing the pressure alternately, a rocking motion is produced, which may be increased so much, that the distance between the lowest depression and highest elevation is a full foot. When the pressure is wholly withdrawn, the stone will continue to rock till it has made twenty-six or more vibrations, from one side to the other, before it settles in its natural horizontal position. Both the lower side of the stone, and the surface of the rock on which it rests, appear to be worn and roughened by mutual friction.

It seems generally agreed, that the rocking-stones of Britain were monuments erected by the Druids; but tradition has not informed us for what purpose they were intended. Mr. Toland thinks that the Druids made the people believe that they alone could move them, and that by a miracle; and that by this pretended miracle, they condemned or acquitted the accused, and brought criminals to confess what could not otherwise be extorted from them. This idea is beautifully alluded to by Mason:

> "——————— Behold yon huge
> And unhewn sphere of living adamant,
> Which, pois'd by magic, rests its central weight
> On yonder pointed rock! Firm as it seems,
> Such is its strange and virtuous property,
> It moves obsequiously to the gentlest touch
> Of him whose breast is pure; but to a traitor,
> Tho' e'en a giant's prowess nerv'd his arm,
> It stands as fix'd as Snowdon."
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> *Caractacus.*

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Surprising Property of Oil in calming the Sea.

THE action of oil, in stopping the violent ebullition of various substances, is truly surprising. It is well known, that if a mixture of sugar, honey, or the like, be boiling upon the fire, and in danger of rising over the sides of the vessel, the pouring in of a little oil makes it immediately subside. In many cases the marking a circle round the inside of a vessel, in which a liquid of this kind is to be boiled, with a piece of hard soap, shall, like a magic ring, confine the ebullition to that height, and not suffer it to stir any farther. This is wholly owing to the oil or fat contained in the soap; but there is, besides these, another very important use of oil on a like occasion, which is the pouring a little of it on any metallic solution, while making; this restrains the ascent of the noxious vapours;
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preserves the operator from danger, and, at the same time, by keeping down the evaporating matter, gives redoubled strength to the menstruum. Pliny has mentioned an extraordinary effect of oil, in stilling the surface of water when it is agitated with waves, and the use made of it, by the divers, for this purpose. *Omne oleo tranquillari*, &c. (lib. ii. cap. 103.) and Plutarch, in Quest. Natur. asks *Cur mare oleo conspersum perlucidum fit et tranquillum?* Pliny's account seems to have been either discredited or disregarded by our writers on experimental philosophy, 'till it was confirmed by several curious experiments of Dr. Franklin, which were published in the year 1774. This property of oil has, however, been well known to modern divers and dredgers for oysters, at Gibraltar, and elsewhere. The divers in the Mediterranean, in particular, descend, as in Pliny's time, with a little oil in their mouths, which they now and then let out; and which, on rising to the surface of the sea, immediately renders it smooth, so as to permit the light to pass through the water, undisturbed by various and irregular refractions. The Bermudans are enabled to see and strike fish, which would be concealed from their view, through the roughness of the sea, by pouring a little oil upon it. And the Lisbon fishermen effect a safe passage over the bar of the Tagus, by emptying a bottle or two of oil into the sea, when the surf is so great as to endanger its filling their boats. Our sailors have also observed, that the water is always much smoother in the wake of a ship that has been newly tallowed than it is in one that is foul. Dr. Franklin was led, by an accidental observation made at sea, in 1757, to attend particularly to Pliny's account; and the various informations which he afterwards received relating to it, induced him to try some experiments on the subject. Standing on the windward side of a large pond, the surface of which was rendered very rough with the wind, he poured a tea-spoonful of oil on the water. This small quantity produced an instant calm over a space of several yards square, which spread amazingly, and extended itself gradually, till it reached the lee side, making all that quarter of the pond, perhaps half an acre, as smooth as a looking-glass. On repeating this experiment, which constantly succeeded, one circumstance struck him with particular surprise; this was the sudden, wide, and forcible spreading of a drop of oil on the face of the water, which, he adds, "I do not know that any body has considered." When a drop of oil is put on a looking-glass, or polished marble, it spreads very little; but on water it instantly expands into a circle, extending several feet in diameter, becoming so thin as to produce the prismatic colours, for a considerable space, and beyond them so much thinner as to be invisible, except in its effects of smoothing the waves at a much greater distance. It seems, says Dr. Franklin, as if a mutual repulsion between its particles took place as soon as it touched the water, and a repulsion so strong as to act on other bodies swimming on the surface, as straws, leaves, &c. forcing them to recede every way from the drop, as from a centre, leaving a large clear space.

In endeavouring to account for the singular effects of oil, Dr. Franklin observes, that there seems to be no natural repulsion between water and air, such as to keep them from coming into contact with each other. Therefore air, in motion, which is wind, in passing over the smooth surface of water, may rub, as it were, on that surface, and rise it into wrinkles, which, if the wind continues, are the elements of future waves. The smallest does not immediately subside, but in subsiding, raises nearly as much of the water next to it. A small power, continually operating, will produce a great action: so that the first-raised waves, being continually acted upon by the wind, are, though the wind does not increase in strength, continually increased in magnitude, rising higher and extending their basis, so as to include a vast mass of water in each wave, which, in its motion, acts with great violence. But if there be a mutual repulsion between the particles of oil, and no attraction between oil and water, oil dropt on water will not be held together by adhesion to the spot on which it falls; it will not be imbibed by the water; but be at liberty to expand itself and spread on a surface, that prevents, perhaps, by repelling the oil, all immediate contact; the expansion will continue till the mutual repulsion between the particles of oil is weakened and reduced to nothing by their distance. Dr. Franklin imagines, that the wind, blowing over water, thus covered with a film of oil, cannot easily catch upon it so as to raise the first wrinkles, but slides over it, and leaves it smooth as it finds it. It moves the oil a little, indeed, which, being between it and the water, serves it to slide with, and prevents friction: hence the oil, dropt on the windward side of the pond, proceeds gradually to leeward, as may be seen by the smoothness it carries with it quite to the opposite side: for the wind, being thus prevented from raising the first wrinkles, which he calls the elements of waves, cannot produce waves, which are to be made by continually acting upon and enlarging those elements, and thus the whole pond is calmed. Upon the whole, there is great room to suppose (notwithstanding the partial failure of an experiment made at Portsmouth, by Dr. Franklin and others), that seafaring people may derive advantages from using oil on particular occasions, in order to moderate the violence of the waves, or to lessen the surf, which sometimes renders the landing on a lee-shore dangerous or impracticable. To this purpose we are informed, that the captain of a Dutch East-India ship, being overtaken by a storm, found himself obliged, for greater safety in wearing the ship, to pour oil into the sea, to prevent the waves breaking over her, which had an excellent effect, and succeeded in preserving her. (*Phil. Trans*. vol. lxiv. part 2. p. 445, &c.) It is also observable, on the coast of Sutherland, when the lump-fish abound in spring, and are devoured by the seals, that the fact may be known by the smoothness of the water above the spot; the oil serving to still the agitation of the waves.

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The Kraken, or Great Sea-Serpent.

THE two most famous monsters described in history, are the Kraken, or Krabben, called by the Norwegians, Soedraulen, and Anker-told, and the Great Sea-Serpent. 'Till of late years, the history of these animals was deemed entirely fabulous; and, although the existence of the latter has more than once been proved by the most satisfactory evidence, within a very recent period, the former is still regarded as a mere chimera. It is indeed singular, that when one of these facts has been fairly verified, which had been so long a matter of doubt, and the credibility of the author thereby established, we should still remain equally sceptical regarding the other, though not in itself in any degree more wonderful.

Our chief subject of investigation shall be the history of the kraken, which is certainly still involved in great obscurity. In the first place, we may observe, that the belief in a certain monstrous sea animal, which appears in calm weather, on the surface of the ocean, like a floating island, and stretches forth enormous arms, or tentacula,—is universal among the sailors and fishermen of the Norwegian coast. A similar monster is alluded to by slmost all the Scandinavian writers, from the earliest period of their history, down to the present day. The epitome of these accounts is this; that, during the prevalence of fine weather, in the warmest days of summer, an enormous animal has been observed in the North Sea, resembling a floating island, about a quarter of a mile in diameter, and appearing to be covered with sea weed, &c. As soon as it has reached the surface, it usually stretches up many vast arms, which equal in size the masts of ships. Having rested for some time, it begins slowly to sink to the bottom, causing a great eddy in the surrounding waters.

The following is the account given by Pontopiddan.

"Our fishermen unanimously affirm, and without the least variation in their accounts, that when they row out several miles to sea, particularly in the hot summer days, and by their situation, (which they know by taking a view of certain points of land) expect to find 80 or 100 fathoms water, it often happens that they do not find above 20 or 30, and sometimes less. At these places they generally find the greatest plenty of fish, especially cod and ling. Their lines, they say, are no sooner out than they may draw them up, with the hooks all full of fish; by this they judge that the kraken is at the bottom. They say this creature causes those unnatural shallows mentioned above, and prevents their sounding. These the fishermen are always glad to find, looking upon them as a means of their taking abundance of fish. There are sometimes twenty boats or more got together, and throwing out their lines at a moderate distance from each other; and the only thing they then have to observe is, whether the depth continues the same, which they know by their lines, or whether it grows shallower by their seeming to have less water. If this last be the case, they find that the kraken is raising himself nearer the surface, and then it is not time for them to stay any longer; they immediately leave off fishing, take to their oars, and get away as fast as they can. When they have reached the usual depth of the place, and find themselves out of danger; they lie upon their oars, and in a few minutes after, they see this enormous monster come up to the surface of the water; he, therefore, shews himself sufficiently, though his whole body does not appear, which, in all likelihood, no human eye ever beheld, (excepting the young of this species, which shall afterwards be spoken of); its back, or upper part, which seems to be in appearance about an English mile and a half in circumference (some say more, but I choose the least for greater certainty), looks at first like a number of small islands, surrounded with something that floats and fluctuates like sea weeds. Here and there a larger rising is observed, like sand banks, on which various kinds of small fish are seen continually leaping about till they roll into the water, from the sides of it; at last, several bright points or horns appear, which grow thicker and thicker, the higher they rise above the surface of the water, and sometimes they stand up as high and as large as the masts of middle-sized vessels.

"It seems these are the creature's arms; and, it is said, if they were to lay hold of the largest man of war, they would pull it down to the bottom. After this monster has been on the surface of the water for a short time, it begins slowly to sink again, and then the danger is as great as before; because the motion of his sinking causes such a swell in the sea, and such an eddy or whirlpool, that it draws every thing down with it." He adds, "The great Creator has also given this creature a strong and peculiar scent, which it can emit at certain times, and by means of which, it beguiles and draws other fish to come in heaps about it."

It is a favourite notion of Pontoppidan, and seems indeed extremely probable, that from the appearance of the kraken originate those traditions of floating islands being so frequently observed in the North Sea. Thus Debes, in his Feroa Reserata, alludes to certain islands which suddenly appear, and as suddenly vanish. Similar accounts may be found in the Mundus Mirabilis of Harpelius, and in the History of Norway, by Torfæus. These islands are looked upon, by the common people, as the habitations of evil spirits, which appear at sea for the purpose of confounding their reckoning, and leading them into danger and difficulty. That these superstitious notions are occasioned by the appearance of some monstrous sea animal, is the more likely, in as far as real floating islands are never seen at sea, being incapable of resisting the swell and tumult of its waters. In lakes, marshes, and rivers, they have sometimes been met with, but never elsewhere.

"But, according to the laws of truth," says Pontoppidan, "we ought not to charge this apostate spirit without a cause. I rather think that this devil, who so suddenly makes and unmakes these floating islands, is nothing else but the kraken, which some sea-faring people call Soedraullen, that is, Soe-trolden, or Sea-mischief. What confirms me in this opinion, is the following occurrence, quoted by that worthy Swedish physician, Dr. Urban Hierne, in his short introduction to an Enquiry into the Ores and Minerals of that country, p. 98, from Baron Charles Grippenheim. The quotation is as follows: 'Amongst the rocks about Stockholm, there is sometimes seen a certain track of land, which at other times disappears, and is seen again in another place. Buræus has placed this as an island in his map. The peasants, who call it Gummer's-Ore, say, that it is not always seen, and that it lies out in the open sea, but I could never find it. One Sunday, when I was out among the rocks, sounding the coast, it happened, that in one place I saw something like three points of land, in the sea, which surprised me a little, and I thought that I had inadvertently passed them over before. Upon this, I called to a peasant, to inquire for Gummers-Ore, but when he came we could see nothing of it; on which the peasant said, all was well, and that this prognosticated a storm, or a great quantity of fish,' &c. "Now," says the bishop, "who is it that cannot discover, at first sight, that this visible and invisible Gummer's-Ore, with its points and prognostications of fish, cannot possibly be any thing else but the kraken, krabben, or so-horven, improperly placed in a map by Buræus as an island? Probably the creature keeps himself always about the spot, and often rises up amongst the rocks and cliffs." vol. ii. p. 214.

Many people have objected to the accounts of the kraken, for very inadequate reasons, alleging, that if such a creature had been created, it would have multiplied like other animals in the course of time, and by its occasional occurrence would ere this have dispelled all doubts concerning its existence. The same futile arguments were applied, and with equal propriety, to the sea-snake, whose existence is now so unquestionably established; and the occurrence of the animal itself among the Orkney isles in the summer of 1808, and more recently off the American coast, where it was seen by hundreds of people, has scarcely been deemed sufficient to corroborate the testimony of the older writers. It appears, in fact, to be a law of nature, that all animals of extraordinary magnitude produce much fewer young than those of inferior dimensions; at least, the elephant, the rhinoceros, the hippopotamus, and the giraffe, are among the least prolific of the race of quadrupeds, and the whale and the walrus are probably even more sparingly multiplied. We need scarcely wonder, then, that so few instances have occurred of a nature sufficiently positive to dispel all doubts regarding the existence of monstrous sea-animals.

We shall next relate the only instance on record, of the dead body of the kraken having been found on the Norwegian coast. The account was drawn up by the Rev. Mr. Friis, consistorial assessor, minister of Bodoen, in Nordland, and vicar of the college for promoting Christian knowledge. In the year 1680, a kraken (perhaps a young and careless one) came into the water that runs between the rocks and cliffs, in the parish of Alstahoug, though its usual habit is, to keep several leagues from land. It happened that its extended long arms, or antennæ, caught hold of some trees standing near the water, which might easily have been torn up by the roots; but, besides this, as it was found afterwards, he entangled himself in some openings or clefts in the rock, and therein he stuck so fast, and hung so unfortunately, that he could not work himself out, but perished and putrified on the spot. The carcase, which was a long while decaying, and filled great part of the narrow channel, made it almost impassable by its intolerable stench. Such is the narrative of Mr. Friis.

The kraken is frequently mentioned by the northern poet Dass, from whose writings, as well as from the popular tales of the country, we might adduce many additional quotations to prove the universality of belief in this uncommon animal. The same monster is, in all probability, alluded to by Olaus Wormius, when treating of whales, in the following passage:

"Restat una species, quam hafgufe vocant, cujus magnitudo latet, cum raro conspiciatur. Illi, qui se corpus vidisse narrant, similiorum *insulæ* quam bestiæ volunt, nec unquam ejus inventum cadaver, quocirca sunt qui existiment, non nisi duo ejus generis in natura esse."

We may here remark, that the circumstance of the dead body of the kraken never being found floating on the sea, is no argument whatever against its existence. The same circumstance may be alledged of all other animals; and it is indeed one of the most singular and unaccountable facts in natural history, that scarcely a creature of any kind is ever found lying dead, which had not come to its death by some violent means.

That the animal mentioned by Wormius, though classed by him among the whales, is the same as the kraken, we have the testimony of Crantz the missionary, who wrote the history of Greenland. In his description of rare and huge sea-monsters, there is the following passage, in which he seems to be equally sceptical with some modernp hilosophers:

"But the most horrible and hideous monster, that the fables of the Norway fishers have invented, is the *krake*, sea-horse, or *hafgufu*, which nobody ever pretends to have seen entire; yet the fishers give out, that when they find a place which is usually 80 or 100 fathoms deep, to be at certain times only 20 or 30, and see also a multitude of fishes allured to the spot, by a delicious exhalation which this creature emits, they conclude that they are over a krake;

then they make haste to secure a good draught of fishes, but take care to observe when the soundings grow shallower, for then the monster is rising. Then they fly with speed, and presently they behold, with the greatest amazement, in the compass of a mile or two, great ridges like rocks rising up out of the sea, dented with long lucid spikes, that thicken as they rise, and at last resemble a multitude of little masts." Vol. i. p. 117.

Thomas Bartholinus describes the same animal, likewise, under the name of Hafgufa; and his relation is confirmed by Olaus Magnus, in his work de Piscibus Monstrosis.

According to Olaus Wormius, the kraken is likewise alluded to in the ancient manuscript called Speculum Regale, said to have been written by Sverre, one of the Norwegian kings.

Having now, we trust, sufficiently established the existence of a monstrous sea animal, known by the name of the kraken, we shall next endeavour to prove its identity with a certain species which has been recorded by some of the most authentic writers in the annals of science.

Pennant, in his description of the eight-armed cuttle-fish, mentions, that he has been well assured by persons of undoubted credit, that in the Indian seas, this species has been found of such a size as to measure two fathoms in breadth across the central part, while each arm was nine fathoms in length. He further states, that the natives of the Indian isles, when sailing in their canoes, always take care to be provided with hatchets, in order to cut off immediately the arms of such of those animals as happen so fling them over the sides of the canoe, lest they should pull it under water, and sink it.

The opinion of Shaw is equally decided regarding the occurrence of this animal.

" The existence of some enormously large species of the cuttle-fish tribe in the Indian and Northern Seas can hardly be doubted; and though some accounts may have been much exaggerated, yet there is sufficient cause for believing that such species very far surpass all that are generally observed about the coasts of the European seas. A modern naturalist chooses to distinguish this tremendous species by the title of the colossal cuttle-fish, and seems amply disposed to believe all that has been related of its ravages. A northern navigator of the name of Dens, is said, some years ago, to have lost three of his men in the African seas, by a monster of this kind, which unexpectedly made its appearance while these men were employed, during a calm, in raking the sides of the vessel. The colossal cuttle-fish seized these men in its arms, and drew them under water, in spite of every effort to preserve them: the thickness of one of the arms, which was cut off in the contest, was that of a mizen-mast, and the acetabula or suckers, of the size of pot-lids." Shaw's Lectures, vol. ii. p. 137.

But of all the authors who have written on the colossal cuttle-fish, the most zealous is undoubtedly Denys Montfort. In his work there are many instances mentioned of its occurrence in various parts of the world, the accounts of which he was fortunate enough to procure from those who were eye-witnesses to what he relates. He mentions particularly the circumstance alluded to by Dr. Shaw, of Captain Magnus Dens having lost three of his men by an attack from this monstrous animal, and the narrative of the fact was given him by Dens himself He further mentions, that at St. Malo, in the chapel of St. Thomas, there is an *ex voto*, or picture, deposited there by the crew of a vessel, in remembrance of their wonderful preservation from a similar attack off the coast of Angola. An enormous cuttle-fish suddenly threw its arms across the vessel, and was on the point of dragging it to the bottom, when the combined efforts of the sailors succeeded in cutting off the tentacula with swords and hatchets. During the period of their greatest danger, they invoked their patron, St. Thomas, vowing to him a pilgrimage, if, by his intercession, they were successful in this perilous rencounter. The confidence inspired by the hope of celestial aid, gave fresh vigour to their exertions, and they succeeded in freeing themselves from their dreadful opponent. On their return home, and before visiting their families and friends, they went in procession to the chapel of St. Thomas, and offered up their prayers of gratitude.

The different authorities which have been quoted, are, we trust, sufficient to establish the existence of an enormous inhabitant of the deep, possessed of characters which in a remarkable degree distinguish it from every creature with which we are at all familiar; and the agreement which may be observed in its descriptions, when compared with those of the celebrated kraken, is sufficiently obvious to warrant the inference which we are now prepared to draw, that the great Norwegian animal so named, is to be considered, not as a wild and groundless chimera, but as either identical with, or nearly allied to, this colossal cuttle-fish.

That great exaggeration pervades the generality of these accounts is perfectly evident; but it is equally clear, that in all the most striking and characteristic properties, there is a very particular, and, indeed, surprising coincidence.

It is probable, that the animal of the North Sea is not specifically the same as the great sea-serpent of the Indian or Atlantic Ocean, the testimonies in favour of the existence of which are clear and undoubted, though their general characters induce us to believe that they are closely allied. Several well-known species of cuttle-fish, though infinitely less, agree with these enormous animals in the nature of their long and numerous tentacula, and more particularly in the pleasant odour which emanates from their bodies. One of these, called the eight-armed cuttle-fish, appears almost to emulate the ferocity of the gigantic species. Its arms are of great extent, and furnished with a double row of cups, or suckers. When full grown, it is a fierce and dangerous animal, and so strong, that it is extremely hazardous to attack it without caution. Such is the ferocity with which it is said to defend itself, that the strongest mastiff can hardly subdue it without a long and doubtful contest, and it has even been known to attack a person while swimming, by fastening itself with violent force round his body and limbs.

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Platina Wire.

WHEN M. Breguet, the celebrated French instrument maker, was in London, he received from Dr. Wollaston a specimen of platina wire, *one-six-thousandth part of an inch in diameter!!*

The following are the data from which Dr. W. infers the dimensions of so small a wire.
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A wire of pure platina is drawn till ten grains of it measure twenty-four inches, so that its diameter is thus known to be 1-100th of an inch.

A portion of this wire is then coated with silver cast round it in a cylindrical mould (about 3-10ths of an inch in diameter).

The cylinder is then drawn till each inch is elongated to 400 inches, in which state the diameter of the platina is known to be reduced in the proportion of the square root of 400 or 20 fold; so that its diameter is then 1-2000th of an inch.

If any portion of the silver wire be then farther drawn till one inch measures nine inches, the platina wire within it is then reduced to one-third part of its last diameter, and is consequently 1-6000th of an inch in thickness.

If the silver part of the wire were then to be dissolved by nitric acid, the diameter of the platina which remains undissolved (although kept perfectly clean and distinct) could not with confidence be pronounced more than 1-72,000th of an inch!!

Hatching Chickens.

THE following singular, though effectual mode of hatching chickens, prevails in the interior of Sumatra; it is vouched for by Major Clayton, of the Bencoolen council. —The hens, whether from bing frightened off the nests by the rats, which are very numerous and destructive, or from some other cause hitherto prevalent in Sumatra, do not hatch their chickens in the ordinary way, as is seen in almost all other climates. The natives have, for this purpose, in each village, several square rooms, the walls of which are made of a kind of brick, dried in the sun. In the middle of these rooms they make a large fire, round which they place their eggs at regular distances, that they may all enjoy an equal degree of heat. In this manner they let them lie for fourteen days, now and then turning them, that the warmth may be better administered to all parts alike, and on the fifteenth day the chickens make their appearance, and prove, in every respect, as strong and perfect as those hatched according to the rules of nature.

Perpetual Periodical Table.

To find the day of the week on which the first day of any month in any year falls, and thence to ascertain the week day of any day whatever, the subjoined table has been constructed.

Directions.—Look in that column where the day of the week stands, on which Jan. 1 of the year required falls, and underneath in that column, opposite to each month, is shewn the day of the week of the first of that month. The column headed L shews the same if the year happen to be a leap year.

Jan. 1	Sunday.		Monday.		Tuesday.		Wednes.		Thursday.		Friday.		Saturday.	
		L		L		L		L		L		L		L
Feb. 1	W		Th		F		Sat		Sun		M		Tu	
Mar 1	W	Th	Th	F	F	Sat	Sat	Sun	Sun	M	M	Tu	Tu	W
Apr. 1	Sat	Sun	Sun	M	M	Tu	Tu	W	W	Th	Th	F	F	Sat
May 1	M	Tu	Tu	W	W	Th	Th	F	F	Sat	Sat	Sun	Sun	M
June 1	Th	F	F	Sat	Sat	Sun	Sun	M	M	Tu	Tu	W	W	Th
July 1	Sat	Sun	Sun	M	M	Tu	Tu	W	W	Th	Th	F	F	Sat
Aug. 1	Tu	W	W	Th	Th	F	F	Sat	Sat	Sun	Sun	M	M	Tu
Sep. 1	F	Sat	Sat	Sun	Sun	M	M	Tu	Tu	W	W	Th	Th	F
Oct. 1	Sun	M	M	Tu	Th	W	W	Th	Th	F	F	Sat	Sat	Sun
Nov. 1	W	Th	Th	F	F	Sat	Sat	Sun	Sun	M	M	Tu	Tu	W
Dec. 1	F	Sat	Sat	Sun	Sun	M	M	Tu	Tu	W	W	Th	Tu	F

Jan. 1, 1809, Sunday
— 1810, Monday
— 1811, Tuesday
— 1812, Wednesday
— 1813, Friday

1814, Saturday
1815, Sunday
1816, Monday
1817, Wednesday
1818, Thursday

1819, Friday
1820, Saturday
1821, Monday
1822, Tuesday
1823, Wednesday

1824, Thursday
1825, Saturday
1826, Sunday
1827, Monday
1828, Tuesday

And so on, regularly advancing one day after each year, except leap year, and then two days.

LEAP YEARS.—1820, 1824, 1828, 1832, 1836, 1840, 1844, 1848.

Explanation of the use of the foregoing Table—Required to know the day of the week of the 1st of September, 1825?

The 1st of January, 1825, in the list of years above, is Saturday, and in the first column of Saturday in a line with September, Thursday is inserted; consequently, the 1st of September, 1825, is shewn to be on Thursday; if 1825 were a leap year, then, as inserted in the second column of Saturday, under the Letter L, it would fall on Friday.

When the day of the week of the first of any month is known, it is easy to ascertain the same of any date in that month, so that by the help of this table, the week day of any date, may be readily ascertained, and in a great degree, as far as respects time, it will answer the purpose of an almanack.

* * *

Groaning and Crying.

A French surgeon lately published a long dissertation on the beneficial influence of groaning and crying on the nervous system. He contends, that groaning and crying are the two grand operations by which nature allays anguish; and that he has uniformly observed, that those patients who give way to their natural feelings, more speedily recover from accidents and operations, than those who suppose that it is unworthy a man to betray such symptoms of cowardice as either to groan or to cry. He is always pleased by the crying and violent roaring of a patient during the time he is undergoing a severe surgical operation, because he is satisfied that he will thereby so soothe his nervous system, as to prevent fever, and ensure a favourable termination. From the benefit hysterical and other nervous patients derive from crying or groaning, he supposes that " by these processes of nature, the superabundant nervous power is exhausted, and that the nervous system is in consequence rendered calm, and even the circulation of the blood greatly diminished. He relates a case of a man, who by means of crying and bawling, reduced his pulse from 120 to 60 in the course of two hours. That some patients often have a great satisfaction in groaning, and that hysterical patients often experience great relief from crying, are facts which no person will deny. As to restless hypochondriacal subjects, or those who are never happy but when they are under some course of medical or dietetic treatment, the French surgeon assures them that they cannot do better than groan all night, and cry all day. By following this rule, and observing an abstemious diet, a person will effectually escape disease, and may prolong life to an incredible extent!

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Conveyancing.

The oldest conveyance of which we have any account, namely, that of the cave of Macpelah, from the sons of Heth to Abraham, has many unnecessary and redundant words in it. "And the field of Ephron, which was in Macpelah, which was before Mamre, the field, and the cave which was therein, and all the trees that were in the field, that were in all the borders round about, were made sure unto Abraham." The parcels in a modern conveyance cannot well be more minutely characterised.

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Pigeons.

By the French law, the lord had a right to the young pigeons of his vassal, except in the March flight. Hartib supposes that there were, in his time, in England, 26,000 dove-houses, and allowing 500 pair to each house, and four bushels to be consumed yearly by each pair, it makes the loss of corn in a year 13,000,000 bushels. In Persia, pigeons are trained to kill the wild ones, of which amusement they are so fond, that a Christian is not permitted to keep any; and Tavernier, who mentions this, adds, that some Christians have become Mahometans, merely to be entitled to this privilege.

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Coronation Oaths.

By the coronation oath in the time of Henry III. the king is bound "se esse præcepturum et proviribus opem *impensurum, ut Ecclesiæ Dei, et omni populo Christiano vera pax omni tempore servetur.*" The Emperor of Japan, by his coronation oath, undertakes to secure fair weather at proper times. The kings of Persia were bound by the same not to pardon any capital offence; and this custom may be chiefly alluded to in scripture, which speaks of the law of the Medes and Persians altering not.

* * *

Ingenious Anagram.

The following anagram, on the well-known bibliographer, William Oldys, may claim a place among the first productions of this class. It was by Oldys himself, and was found by his executors in one of his MSS.

W. O.

In word and Will i am a friend to you;
And one friend Old is worth an hundred new.

* * *

Animal Flower.

The inhabitants of St. Lucie have lately discovered a most singular plant. In a cavern of that isle, near the sea, is a large bason, from twelve to fifteen feet deep, the water of which is very brackish, and the bottom composed of rocks. From these, at all times, proceed certain substances, which present, at first sight, beautiful flowers, of a bright shining colour, and pretty nearly resembling our marigolds, only that their tint is more lively. These seeming flowers, on the approach of a hand or instrument, retire, like a snail, out of sight. On examining their substance closely, there appear, in the middle of the disk, four brown filaments, resembling spiders' legs, which move round a kind of petals with a pretty brisk and spontaneous motion. These legs have pincers to seize their prey; and, upon seizing it, the yellow petals immediately close, so that it cannot escape. Under this exterior of a flower is a brown stalk, of the bigness of a raven's quill, and which appears to be the body of some animal. It is probable that this strange creature lives on the spawn of fish, and the marine insects thrown by the sea into the bason.

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Sketch of the numerous Classes of Persons, whose Trades are connected with, and in some degree dependent upon, the Building, Equipment, and Employment of British Shipping.

A ship-owner, in order to build a ship, must necessarily employ *the Ship-builder*, who derives his knowledge from the arts and sciences, and who, in the construction of the ship, gives employment to

The shipwright, the sawyer, the caulker, the joiner, the blacksmith
The Baltic merchant for tar, pitch, iron, and other stores imported from abroad
The Canada merchant for timber, &c.
The copper merchant and copper-smith, for copper-bolts, &c.
The iron master, for iron knees, &c.
The dealers in old rope, for oakum, which is generally made by infirm and old persons, who are incapable of laborious employment
The landed interest for timber, &c.

The Mast and Block-maker gives employment to
The Baltic merchant, for masts, &c.
The West-India merchant, for lignum vitæ, &c.
The landed interest, for elm for pumps, &c.
The manufacturers of varnish, &c.
The journeymen block-makers.
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The Sail-maker gives employment to
  The sail-cloth manufactories for canvas
  The rope-maker for bolt rope
  The twine-spinner for twine, lines, &c.
  The Baltic merchant for tar, flax, hemp, &c.
  The journeymen sail-makers.

The Rope-maker gives employment to
  The Baltic merchant for hemp, tar, &c.
  The blacksmith for iron implements
  The iron wheel-maker for wheels
  The carpenter for sledges
  The journeyman rope-makers.

The Ship-chandler gives employment to
  Manufacturers of ivory-black, white-lead, &c.
  To the brush-maker for brushes, &c.
  To the turner for bowls, platters, spoons, &c.
  To the broom-maker for brooms
  To the manufacturers of horn, &c.
  To the hardwareman for shovels, &c.
  To the twine-spinner
  To the needle-maker for needles
  To the wire-maker for wire
  To the potter
  To the scale-maker for steel-yards
  To the lead merchants for sounding leads, sheet lead
  To the lamp-maker for binnacle lamps
  To the time-glass-maker for time-glasses
  To the tinman for lanthorns, speaking trumpets, copper pumps, &c.
  To the iron founder for cannon and shot
  To the gunpowder-maker for powder
  To the gunsmith for muskets, pistols, &c.
  To the locksmith
  To the sword-cutler for cutlasses
  To the mathematical instrument maker for compasses, quadrants, and sextants
  To the manufacturer of bunting colours, &c.
  To the ironmonger for fish-hooks, nails, pump-tacks, &c. &c.

To the lead shot maker for bullets
To the leather-sellers for sheep skins, for hides
To the ironmonger and hardwareman for marlin-spikes, &c.
To the Baltic merchants for pitch, tar, rosin, &c.

The Boat-builder gives employment to
The Baltic merchant for wainscoat, tar, and pitch
To the land-holder for oak and elm, &c.

The Plumber gives employment to
The lead merchant for lead, &c.

The Glazier and Painter give employment to
The glass manufacturer for glass
The oil manufacturer for oil
The colour-maker for colours, &c.

The Cooper gives employment to
The Baltic merchant for staves, iron
To the Canada merchant for ditto, wood
To the hoop-bender for wood, hoops, &c.

The Tallow-chandler gives employment to
The Baltic merchant for tallow
To the West-India merchant for cotton
To the tallow melter for tallow, &c.

The Grocer gives employment to
The sugar baker
To the West-India merchants
To the Mediterranean and Portuguese merchants.

The Coal Merchant gives employment to
The proprietors of coal mines
To lightermen, &c.
To bargemen, &c.

The Butcher gives employment to
The farmer, grazier, &c.

The Baker gives employment to
The miller for flour, &c.
To the farmer for peas, &c.

The Cheesemonger gives employment to
The farmer for butter and cheese.

The Brewer gives employment to
The maltster for malt
To the hop merchant for hops,
To the back-maker for backs
To the cooper for casks
To the copper-smith for coppers, &c.

The Brasier gives employment to
The coppersmith for copper, &c. &c. &c.

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Mean Temperature of the Earth.

THE temperature of the latter end of April is observed, at least in the temperate zone, to be nearly the mean temperature of the year. From that time the heat increases, and is at its maximum about the 21st of July; it goes on decreasing from that time till it comes to the mean in the end of October, and it passes from thence to the greatest cold about the 21st of January.

As we go eastward from the shores of the Atlantic, the mean temperature of any parellel becomes lower, at a rate that may perhaps, for the north part of the temperate zoue, be estimated at a degree for 150 miles.

At. St. Petersburgh, lat. 59° 56°, about 750 miles from what may be accounted the shores of the Atlantic, the temperature is 5° 5′ below the standard. The medium temperature of January is no more than 10° By computation from the formula above, it ought to be greater than 32°. The winter lasts from October to April, and the cold is sometimes as great as the freezing point of mercury, or —39°. From a mean of several years, the mean of the winter cold is—25°.—*Kirwin, p.* 61.
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It was at Krasnojark, lat. 56° 30′, long. 93° E. that mercury was first known to freeze by natural cold.

If we were to begin where any parallel intersects the shore of the Atlantic, and draw on the map a line, along which the mean temperature should be constantly the same as at the first mentioned point, it would incline greatly to the south. The point, for instance, in the meridian of Petersburgh, which has the same temperature with the standard belonging to the parallel of that city, is about 5° south of it, or in the latitude of 54° 30′ nearly.

At Irkutz, latitude 52° 15′, longitude 105° east, the mean temperature from October to April has been known to be as low as 6°.8, a temperature which, for severity and duration, exceeds any thing that has been observed elsewhere.

This increase of the severity of the winter, and the consequent diminution of the mean temperature, on going eastward, holds in all the latitudes north of the parallel of 30°; but the diminution is slower as we approach that parallel; to the south of 30°, the mean heat increases on retiring from the ocean.

This diminution takes place all the way to the shores of the Pacific, or very near them. The climate of Pekin is vastly more severe than that of the same parallel (39° 54′) in Europe.

In the New Continent also, at least in the part of it to the north of the Tropic of Cancer, the mean temperature is much below the standard, and the severity of the winter much greater than in the same latitudes in Europe.

At Prince of Wales' Fort, Hudson's Bay, lat. 59°, long. 92° west, the mean temperature is 20° under the standard; at Nain in Labrador 16°; at Cambridge in New England (lat. 42° 25′) 13 degrees. Mercury has been supposed to be frozen by the natural cold as far south as Quebec, lat. 47°.

A very low mean temperature, and extreme cold in winter, are characteristic of the climate of North America.

In the higher latitudes of the southern hemisphere, the temperature is lower than in the same latitudes of the northern hemisphere.

Forster describes a small island on the coast of South

Georgia, lat 54° south, which, in the middle of summer, was covered almost entirely with frozen snow to the depth of several fathoms.

The South Pole is surrounded, to the distance of 18 or 19 degrees. with a barrier of solid ice, through which, even the skill and intrepidity of Captain Cook could not force a passage.

It is known also, that detached masses of ice float down in that hemisphere as low as the latitude of 46°. The cause of this phenomenon is by no means sufficiently understood. —*Professor Playfair.*

⁂

Wonderful Lake.

In Carniola, there is a very extraordinary lake, called the Zirchnitzer Sea. It is dried up during summer, and, after affording a vast quantity of fish, that are caught in the holes through which the waters disappear, produces a fine crop of grass or hay, and is sometimes sown with millet; thus continuing of advantage to the inhabitants as arable or pasture land, 'till, in September, the waters rush back again through the holes with great impetuosity, and the lake is restored to its original size. This curious phenomenon is explained in the following manner. The country is hilly, and the lake is surrounded with rising grounds. It has no visible exit, yet seven rivulets empty themselves into it. By subterraneous channels it communicates with two lakes concealed under ground, the one situated below, the other above, its own level. Into the first it empties itself by means of the holes in its bottom; from the second it receives a supply equal to its waste, which prevents it sinking under ground during the winter. From the lowest lake a considerable river runs. In the summer, the uppermost lake, not beeing fed as usual by rain, becomes smaller, and ceases to supply the Zirchnitzer Sea with water. The waste of this lake, therefore, being greater than the supply, it is drained in consequence, and disappears. When the uppermost lake is restored to its usual size, it affords the proper quantity of water; hence the lowest lake swells, and at last forces part of its contents through the holes into the open air, and thus restores the Zirchnitzer Sea to its original size."

* * *

Touching for the King's Evil.

An old man, who was witness in a cause, gave the following account of this supposed miraculous healing. He had, by his evidence, fixed the time of a fact by Queen Anne's having been at Oxford, and touched him, whilst a child, for the evil: when he had finished his evidence, he was asked whether he was really cured? He answered with a smile, that he believed he never had a complaint that deserved the name of evil; but that his parents were poor, and had no objection to the bit of gold. This piece of gold, which was given to those who were touched, may account for the great resort upon the occasion, and the miraculous cures supposed to be afterwards affected. Gemelli, the famous traveller, also gives an account of 1600 persons offering themselves to be cured of the evil to Lewis XIV. on Easter Sunday, in the year 1686. Gemelli was himself present at this ceremony, and says, the words used were, "Le roi te touche, Dieu te guerisse." Every Frenchman received fifteen sous, every foreigner thirty, after being touched. To some of the supposed patients, the king said significantly, *Are you sick too?* This power of healing by the kings of France, occasioned great resort to Francis. I. (whilst prisoner at Madrid) by the Spaniards, who did not conceive that their own king's touch would effect the cure.

By a proclamation of the 18th of June, 1626, it is ordered that no one shall apply for this purpose, who does not bring a proper certificate that he was never touched before. This regulation must, undoubtedly, have arisen from some supposed patients, who had attempted to receive the bit of gold more than once.

* * *

Epitaphs.

"I HAVE always been fond," says an anonymous writer in the *Literary Gazette*, "of visiting village burying grounds. It would not be a difficult task to convert them into a species of rustic mental school. Yet a step further:—Would not the church-yard be turned into a "biographical library" for the lower orders, were each deceased's exact character to be engraven on the stone which covers his virtues or vices? Might not a strong feeling of emulation be excited? This could be arranged by the clergyman of the parish. We are none of us indifferent to the regards of posterity. "Victory or Westminster Abbey!" was the battle-shout of one of our greatest heroes. This "love of fame"—this "universal passion," pervades all human minds, in a more or less degree. With what pride would the children of the virtuous poor man read on his tomb-stone the epitome of his worth;—and what a lesson would the offspring of a different character receive from the "stigmatized," even in death!"

The examples which are subjoined will shew that this order of writing is not without its beauty.

Epitaph from the Greek.

Pillars of death! carv'd syrens' tearful urns!
In whose sad keeping my poor dust is laid,
To him that near my tomb his footsteps turns,
Stranger or Greek, bid hail! and say, a maid
Rests in her bloom below; her Sire the name
Of Myrtis gave; her birth and lineage high;
And say her bosom friend Erinna came,
And on the marble graved her elegy.

From the Modern Greek.

On a Tomb in the Island of Zante.

. . . .

The Maid who in this grave is sleeping,
Has left her young companions weeping;

And thoughts of her have plunged in sadness
Hearts to whom they once gave gladness!
Lovely in form—in mind excelling—
A spirit pure in heavenly dwelling.
She died—and we again shall never
See one like her—now lost for ever!

By Dr. Lowth, bishop of London, on his daughter Maria, as translated from the Latin, by Mr. Duncombe.

Dearer than daughter, parallel'd by few
In genius, goodness, modesty,—adieu!
Adieu! Maria—'till that day more blest,
When, if deserving, I with thee shall rest.
Come, then, thy sire will cry, in joyful strain,
O! come to my paternal arms again.

From the French.

On a Tomb-stone in Auvergne.

Marie was the only child of her mother,
"And she was a widow."
Marie sleeps in this grave—
And the widow has now no child.

Inscription on a Stone in the English Burying-ground at Bourdeaux.

. . . . . .

There was a sweet and nameless grace,
That wander'd o'er her lovely face;
And from her pensive eye of blue,
Was magic in the glance which flew.
Her hair of soft and gloomy shade,
In rich luxuriance curling stray'd;
But when she spoke, or when she sung,
Enchantment on her accents hung.
Where is she now?—where all must be—
Sunk in the grave's obscurity.

Yet never—never slumber'd there
A mind more pure—a form more fair!

In a Church-yard in Northumberland.

. . . .

The world has long since wearied me,
  And now, my appointed task is done,
Parting it without enmity,
  I'll take my staff, and journey on.

On a Tomb-stone in an Irish Country Church yard.

A little Spirit slumbers here,
Who to one heart was very dear.
Oh! he was more than life or light,
Its thought by day—its dream by night!
The chill winds came—the young flower faded,
And died;—the grave its sweetness shaded.

Fair Boy! thou should'st have wept for me,
Not I have had to mourn o'er thee:
Yet not long shall this sorrowing be.—
Those roses I have planted round,
To deck thy dear and sacred ground,
When spring-gales next those roses wave,
They'll blush upon thy mother's grave.

On a tomb stone in the church yard of Runcorn, in Cheshire.

"This stone was erected by Æneas Morrison, the husband of Janet Morrison, to designate the spot where her remains are deposited; that her infant children, when they shall have attained a more mature age, may approach it with reverential awe, and pledge their vows to heaven, to respect her memory by imitating her virtues."

From the French, in the Burying-ground of Mont-Louis, in Paris.

. . . .

Mother—sweet Mother, thou canst never know
That yearly thus I deck thy mossy bed
With the first roses of the Spring that blow,
And tears of fond affection shed.

Mother—sweet Mother, tho' I knew thee not,
I feel that one I love is buried here;
And tho' this grave by others is forgot,
To me it shall thro' life be dear—most dear.

In Cartmell church-yard, Westmoreland, there is a neat tomb-stone to the memory of Mr. John Fell, who had been for many years the active surveyor of the turnpike roads from Kirby Kendal to Kirby Irleth. Upon the stone are the following appropriate lines:—

Reader, doth he not merit well thy praise,
Whose practice was through life to *mend his ways?*

It is sometimes the mark of a great mind or a good temper, when a man jests with his own infirmities, but a jest upon our last remains, has too much of levity or pride; and is far removed from that elevation of soul which regards death with equanimity, upon the principles of piety and resignation.

It should seem, however, from the ludicrous inscriptions to be met with in our church-yards, (more especially in the country) that men are at times disposed to make a jest even of the grave, and we can hardly tell whether to drop a tear on the weakness, or to smile at the folly, of these "frail memorials," so different from the beautiful description of the poet.

"And many a holy text around she strews
To teach the rustic moralist to die."

When we meet with such lines as

"Life is a jest, and all things show it,
I thought so once, but now I know it."

we are inclined to think the witty author of them had no other intention than that of making a couplet; as the sentiments of a wise man they will hardly be admitted. "All may be vanity," but not a jest; and we cannot consider that a proper regard has been paid to his memory by giving them as his last sentiments; there is too much of the absurd. The idle, and the vain, too often take occasion from such opinions to confirm themselves in error, not to say vice.

Inscriptions and epitaphs under the inspection of, and regulated by the minister or curate of the parish, as suggested by the anonymous writer we have quoted, would at least prevent the indulgence of ridicule in the young and thoughtless, where they ought to be serious. We shall not repeat more of these fooleries than may suffice to show that they are yet of a recent date. In Doncaster church yard, 1816, may be seen the following:

"Here lies 2 Brothers by misfortun serounded,
One dy'd of his wounds & the other was drownded."

And in the neighbouring ground at Arksey, of a less recent date, may be found several equally ludicrous, from among which we select the following:

Farewell, my friends all,
  Sisters and dear mother,
You have lost your son,
  And have got no other.

IN BIDEFORD CHURCH YARD, DEVON.

The wedding day appointed was,
  And wedding clothes provided;
But ere the day did come, alas!
  He sicken'd, and he die did.

IN SEVEN OAKS, KENT.

Grim Death took me without any warning:
I was well at night and died in the morning.

We shall conclude with one placed on the tomb of a man, who had desired by will to have something said on his grave stone; he was rich, but alas! that was all; his executors were conscientious men, and at a loss how to designate a character, where there was no character at all, at length hit upon the following—

" Silence is wisdom.'

* * *

The Divining Rod

THE *virgula divinatoria*, or divining rod, is a forked branch, or two shoots or young branches of a fruit-bearing tree, tied together at one end, and held by the other ends, one in each hand. When held in a certain position, and under certain circumstances, it is said to discover the situation of metals, &c. in the earth, by dipping as it approaches the place beneath which they immediately lie.

It is not known who was the discoverer of it; but Agricola, in his treatise *De Re Metallica*, supposes that it took its rise from the magicians, who pretended to discover mines by inchantment; others are of opinion that the discovery is of later date, and that the inventor was hanged in Germany as an impostor. Be that as it may, no mention is made of it earlier than the 11th century; and though it has occasionally occupied attention for so long a time, yet the niceties attending its use according to the prescribed directions, and probably, too, the difficulty of accounting for the effects said to be produced by any plausible theory consistent with the admitted laws of natural philosophy, may have retarded its progress; for it is now almost totally neglected.

About the middle of the 18th century it was ably supported in France by De Thouvenel, who published a book upon the subject, in which he endeavoured to substantiate the virtue of the divining rod by the recital of about six hundred instances of its successful employment, principally by himself or within his own knowledge; and soon after by a philosopher of unimpeachable veracity, and a chemist, William Cookworthy, late of Plymouth. The favourable opinion he entertained of it was grounded, according to his own account, as became a chemist, upon actual experiment. It appears that his experiments were frequently repeated, and that the ease which he attained in using the *virgula* was the means of his satisfying many intelligent men of its virtue, by experiments for the discovery of pieces of metal hid in the earth, as well as by the discovery of a copper mine near Oakhampton, which was worked for several years. Thus it became introduced into Cornwall, where the discovery of several mines is attributed to it; and there are yet a few among the most intelligent practical miners in the county who continue to believe in its virtue. The first knowledge he procured of the rod was from a Captain Rebeira, who deserted the Spanish service in Queen Anne's reign, and became Captain Commandant of Plymouth garrison; and as Cookworthy's veracity and abilities were unquestionable, and as it undeniably appears that he made many experiments with the rod, it seems as if his account demands some degree of confidence. But the earlier writers who mention it, appear to have supposed that its operation was the effect of magic; and thence the cutting of it was, according to their directions, to be attended by the utterance of certain cabalistic words, and the performance of certain ceremonies: they directed it to be cut on a certain day, and at a certain hour, from a tree of a certain description, before sun-rise, about the day of the annunciation of the Virgin Mary, but especially with an increasing moon. It has, however, of later times been agreed, that a forked hazle rod, or two straight rods of one year's growth, being most pliable, cut in the winter and kept till they are dry, answer best; or, if these be not at hand, suckers of the apple or currant-tree, or shoots of the peach-tree, willow, or oak, though green, will do tolerably well, but those of the fruit-bearing trees are preferred. If the rod be made of two separate shoots, they are tied together at their larger ends with some vegetable substance; and these, it is said, answer better than those which grow forked, the shoots of which, being rarely of equal size and length, do not handle so well. The length of the rod is from two and a half to three feet.

Upon a nice observation of the mode of holding the rod, prescribed by Cookworthy, much seems to depend. Having, as has been observed, tied the larger ends of the sticks together, the smaller are to be held, one in each hand, with that part which is grasped by the hand so turned as to be brought parallel to the horizon, and the tied ends pointing upwards at an elevation of about 70 degrees. The more strongly the rod is grasped, the livelier is said to be its action: but it is peculiarly necessary to observe that it be grasped steadily and equally; for if, when the movement or attraction of the rod is commenced, there be the least imaginable opposition to it by a jerk, it will not move any more, till the hands have been opened, and a fresh grasp taken. It appears, that a due observance of this is of much importance, and that the operation of the rod has, in many instances, been defeated by a jerk, or counter-action; and thence, says Pryce, in his *Mineralogia Cornubiensis*, who was "well convinced of its absolute and improveable virtues," it has been concluded, that there is no real efficacy in the rod. It must, he says, be particularly observed, that as our animal spirits are necessary to this process, so a man ought to hold the rod with the same indifference and inattention to, and reasoning about it, or its effects, as he holds a fishing-rod, or a walking-stick; for, if the mind be occupied by doubts, reasoning, or any other operation that engages the animal spirits, it will divest their powers from being exerted in the process, in which their instrumentality is absolutely necessary; hence, he observes, it is, that the rod constantly answers in the hands of peasants, women, and children, who hold it simply, without puzzling their minds with doubts or reasonings. Whatever, adds he, may be thought of this observation, it is a very just one, and of great consequence in the practice of the divining rod.

Equipped as has been described, and duly observing the foregoing directions, the person in search of a metallic lode is to walk steadily and slowly forward; and when he approaches a lode so nearly as its semi-diameter, the rod, it is said, will feel loose in his hands, and be sensibly repelled towards his face: if it be thrown back so far as to touch his hat, it must be brought forward to its usual elevation, when it will continue to be repelled till his foremost foot is over the edge of the lode: and when this is the case, if the rod be held well, there will be first a small repulsion towards the face; but this is momentary, and the rod will be immediately drawn irresistibly down, it is said, and will continue to be so during the whole passage over the lode: but as soon as the foremost foot is beyond its limits (Pryce's Mineralogia Cornubiensis), the attraction from the hindmost foot, which is still on the lode, or else the repulsion on the other side, or both, throws the rod back towards the face. When the rod has been drawn down, the hands must be opened, the rod raised by the middle fingers, a fresh grasp must be taken, and the rod held again as before; for, if it be raised again without opening the hands, it will not work.

Pryce, at p. 123 of his *Mineralogia Cornubiensis*, informs us that many mines have been discovered by means of the rod, and quotes several; but it must be observed that, by his own account of the adventures, not one of them turned out a profitable concern; and hence he takes occasion to observe, that it is by no means a disadvantage that the rod dips equally to a poor as to a rich lode, which he allows to be the case; otherwise the great prizes in the mining lottery would soon be drawn, and future adventurers be discouraged!

But though the rod is said to dip equally to a poor as to a rich lode, it is not found to dip with the same force to all metals; nor, indeed, does it appear to be continued to metals alone, but that it is also attracted by coals, bones, lime-stone, and springs of water, with different degrees of strength, in the following order:—1. Gold. 2. Copper. 3. Iron. 4. Silver. 5. Tin. 6. Lead. 7. Coals. 8. Limestone, and springs of water. The mode directed by Cookworthy for proving this, is the following: with the rod held according to the prescribed rules, stand with one foot advanced, put under it a guinea, and a halfpenny under the other, and the rod will be drawn down forwards; if the pieces of money be shifted, it will still be attracted towards the gold, *i. e.* towards the face; which proves that the gold possesses the stronger attraction: and, by thus varying all the forementioned substances, the strength of their respective attractions will be found to correspond with the order in which they are placed.

According to Captain Rebeira, the virtue necessarily resident in the human body for the discovery of metals, &c. in the earth by means of the divining rod, is confined to but few persons; and Agricola very shrewdly insinuates, that where it does not act, it must be owing to some singular occult quality in the person. Cookworthy and Pryce, however, affect that Rebeira was mistaken; for that the virtue, as he calls it, resides in all rods and in all persons, though not in every rod in the hands of every person. Willow and other rods, say they, will not be attracted in the way which fruit-bearing rods are attracted, but will answer in hands in which the fruit-bearing rods are *not* attracted; so that all persons possess the virtue.

If a piece of the same wood as that of which the rod is composed, be placed under the arm, it will totally destroy the operation of it, except in the instance of water, for which any rod, they say, in any hand will answer; or if the least animal thread, as silk, or worsted, or hair, be placed on the top of the rod, it will prevent its operation: but if a piece of the same animal substance, or of the same wood as that of which the rod is made, provided the rod does not answer, be placed under the arm, it will cause the rod to operate. If a piece of gold be held in the hand and touching the rod, it will prevent its being attracted by that metal or by copper, for the rod will be repelled towards the face; or if iron, lead, tin, silver, limestone, bone, or coal, be held in like manner, it will also be repelled, and *vice versa*. If a person with whom the rod does not naturally operate, hold a piece of gold in his hand, the rod then answers to gold and copper; and thus with respect to the other metals and substances; and upon these properties of the rod depends its power of distinguishing one metal or substance from another. Another mode however, grounded upon the same principles, is pointed out as being much more ready and certain, viz. by preparing rods that will only answer to some one of the aforementioned substances. The mode of preparing them is by boring a small hole in the top of the rod, and by putting into it a very small quantity of each substance, except that after which search is to be made: the hole is then to be stopped up with a piece of the same wood of which the rod is made. These are the directions which Cookworthy has given for the use of the divining rod.

It is now but little if at all practised in this country: the few among the curious, or among practical miners, who continue to assert that it possesses an influence in the discovery of ores, seem so far to have yielded to its opponents as to have given up the use of it.

Taking it for granted, however, that metals do act upon the rod to the fullest extent of Cookworthy's belief, it still remains a question, notwithstanding the accommodating opinion of Pryce, whether it would prove a benefit to the miner, as it is allowed that it dips equally to the poor as to the rich lode, to a silver penny as to the mines of Potosi; for it is too often experienced in Cornwall that lodes are not wanting, but ore. The advantage to be derived from it, therefore, with regard to metallic veins seems by no means a counterbalance to the niceties and uncertainties attending its use; for the projector, implicitly depending upon the information of the rod, might, at a ruinous expense, ransack the bowels of the earth, in consequence of its dipping to a rich gossan, or a dead lode.

The faculty of subterraneous discovery has been referred to the theory of effluvia, or to the corpuscular philosophy, for explanation; but it seems only to have been hypothetically referred to an hypothesis. For, in the first place, although the asserted effects of the rod have been copiously described, a definition of its *modus agendi*, where it will act, has been wanting, nor have we been told what particular constitutional defects have in most cases prevented its acting at all; and secondly, the theory of the corpuscular philosophy, though perhaps it may be impossible wholly to reject it, has never been completely admitted. Rebeira permitted persons to see him use the rod, but would discover no more; and neither Cookworthy nor Pryce has said whether, as the practiser in the divining art approaches a spot under which springs or metals lie hid, he feels any internal sensations; but Thouvenel has more completely provoked doubt, by asserting, that internal sensations, nearly approaching to morbid affections, are felt, at the same time that an external motion is communicated to the rod. These singular emotions, none of which were observed to take place when he was above stagnant waters, were followed by head-ache, fatigue of body, debility of mind, and other symptoms of nervous irritation. The dry state of the atmosphere, also favourable to electric experiments, was observed to render him more active and lively in his prognostics; but a full meal evidently diminished the capacity: and an inflammatory fever, which confined him a fortnight to his bed, deranged or destroyed the miraculous power for the space of three months. From these circumstances it should seem that its action is dependent on some peculiar nervous sensibility; that our faith or our imagination should be prepossessed in its favour, according to Pryce; and that much depends on an harmonious distribution of the animal spirits, devoid of anxiety or reasoning respecting the event: but that a state of doubt is an obstruction to its operation. These, perhaps, may be the principal difficulties in using the divining rod; but we are assured by Cookworthy and Pryce, that, regarding these and other essentials in its use, a rod may be found adapted to the peculiar system of every person.

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Iron Hanging Bridge.

THE Iron Hanging Bridge now constructing over the Menai Strait, will, when completed, be perhaps, one of the most singular works of art that any age or nation ever produced. It has been designed by Thomas Telford, Esq. who has for many years bestowed great pains and expence in making a vast number of experiments on the strength of iron suspended, as well vertically as horizontally, and with various degrees of curvature. The Menai bridge, as represented in Plate XII., is to consist of one opening of 500 feet between the points of suspension, and 108 feet in height, between the high-water line, and the lower side of the road-way; and the road-way being horizontal, this height is uninterrupted for the whole 500 feet, except where the natural rock, which forms the western abutment, now interposes. But, in addition to these 500 feet, there are to be four arches on the western, and three on the eastern side of this main opening, each fifty feet span; that is, making in all, 850 feet of opening. The drawing also shews, that, in regard to the navigation, it is far preferable to any bridge of an arched form, because the latter affords the full height of 100 feet only in the middle; whereas, the former, as has just been observed, affords the same full height for the whole of the 500 feet, which will be a considerable advantage to vessels passing the Menai Strait, as it will allow them to stand closer to either shore while passing under the bridge. In regard to economy, this bridge, on the principle of suspension, has equally the advantage, the estimated expence not being more than £70,000; whereas the cheapest of the arched form, made of cast iron, would have cost nearly double that sum.

With respect to the facility of execution, it must be evident to any person the least conversant with mechanical operations, that the bridge-part of the large opening in the drawing, may be constructed nearly as readily as the centering only for a bridge of a single arch of cast iron of the same span.

The road-way will consist of two carriage-ways, each twelve feet in breadth, with a foot-path of four feet between them, so that the platform will be about thirty feet in breadth. The whole is to be suspended from four lines of strong iron cables, by perpendicular iron rods, placed five feet apart, and these rods will support the road-way framing. The suspending power is calculated at 2016 tons, and the weight to be suspended, exclusive of the cables, is 342 tons, leaving a disposable power of 1674 tons. The four sides of the road-ways will be made of framed iron-work, firmly bound together for seven feet in height, and there will be a similar work, for five feet in depth below the cables. The weight of the whole bridge between the points of suspension will be 489 tons.

It is calculated that the contraction and expansion of the iron cables may occasion a rise or fall to the extent of four or five inches; but the variations of the temperature of the atmosphere will not derange the bridge.

The abutments will consist of the masonry-work, as it is represented in the drawing; each of the two piers will be 60 feet by 42½ wide at high-water mark, having a foundation of rock. These piers, when connected with the whole of the remainder of the masonry, will form a mass constructed with blocks of hard lime-stone, of much greater weight than is necessary for supporting a bridge of this kind. Upon the summit of the two main piers will be erected a frame of cast iron, of a pyramidal form, for the purpose of raising the cables from which the bridge is to be suspended. As the cables will be carried from the top of the pyramids so as to form nearly similar angles on each side, the pressure will be almost perpendicular.

Mr. Telford proposes to have four lines of suspension in the breadth of the bridge, by which means the cables will be disposed in such a manner as to divide it (as before stated) into two carriage-ways of twelve feet each, with a foot-way of four feet in the centre. Along each line there will be four cables, making in the whole sixteen; these cables will pass over rollers fixed on the summits of the pyramids, and be fastened at their extremities to an iron frame, lying horizontally over the top of the small arches, and under a mass of masonry, as described by the *dotted lines* in the annexed Plate. From these cables the road-way will be suspended by vertical iron rods, connected at their lower extremities with wrought iron bars, both transversely and longitudinally, thus forming a frame on which timber will be laid for the road-way. The distance of five feet is kept between the rods, in order that the suspending power may be equally distributed throughout the whole length of the bridge. The suspending rods will pass between the cables, and depend upon every two of them, so that the general strength of the bridge could not materially be affected by taking one away. The cables and the flooring, as well as the suspending rods, will be constructed and united in such a manner, that each of the parts may be taken out and replaced separately; so that there can be no difficulty in repairing any part of the bridge, whenever required. A temporary wire-bridge will be made from one abutment to the other, in order to carry over the cables, and arrange the several parts of the bridge, while building.

The weight of each separate cable between the points of suspension, is estimated at nine tons and three-quarters, or 117 pounds per yard. The weight of a drove of oxen is calculated at about 300 tons, supposing them to amount to 200 head, all closely huddled together; and the estimated weight necessary to tear the cables asunder is upwards of 2,000 tons, which is about four times the weight of the entire bridge. The passing of a mail-coach over the bridge is not expected to produce any undulation, or sensible perpendicular vibration; nor is any lateral vibration apprehended from the most violent gale of wind, by reason of the proportion that the breadth of the bridge bears as a frame to its extreme length.

Iron has this peculiar property, that a certain weight extends the length of the bar. After standing some time, the bar remains of that length, and it requires an additional weight to give it an additional stretch; so that, although the actual dimensions of the sectional area of the bar become less, yet it bears a greater weight Hence, should any one of the bars in this hanging-bridge, when first placed there, bear a greater weight than the one next to it, or any other bar, and be exposed to a stretch, it would soon accommodate itself to the length of the whole; and, in that state, be capable of bearing more weight than it did at first. Half-inch bars, of tolerably good iron, will bear from six tons to six and a half; but they will elongate at not much more than half that stress. It is a curious fact, and deserving of the attention of philosophers, that frequently, at the moment of rupture, the bar acquires such a degree of heat in the fractured part, as scarcely to allow a person to hold it grasped in his hand without a painful sensation of burning.

The Menai Bridge was expected to be completed in three years from the time of its commencement, in 1819. The foundation of the abutments, on both shores, is on solid rock. The stone, of which the masonry of the piers will be constructed, is procured in the north-east end of the Isle of Anglesea, from the estate of Lord Bulkeley, where the cliffs are nearly one hundred feet high. It is fine grey marble, perfectly solid, and in large masses, lying in a very convenient situation close to the sea-shore, where it is loaded into vessels, and carried through Beaumaris Bay to that part of the Menai Strait where the bridge is to be erected.

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The Jew's Leap.

CAPTAIN Riley and his fellow sufferers from shipwreck, in their journey from Santa Cruz, towards Moggadore, crossed a remarkably dangerous and frightful pass, called the *Jew's Leap*. "The path," says Captain Riley, "which we were now obliged to follow, was not more than two feet wide in one place; and on our left, it broke off in a precipice of some hundred feet deep to the sea; the smallest slip of the mule or camel would have plunged it and its rider down the rocks to inevitable and instant death, as there was no bush or any thing to lay hold of by which a man might save his life. Very fortunately for us, there had been no rain for a considerable time previous, so that the road was now dry. Rais told me, when it was wet it was never attempted, and that many fatal accidents had happened there within his remembrance; though there was another road which led round over the mountain far within the country.

"One of these accidents, he said, he would mention.—A company of Jews, six in number, from Santa Cruz for Morocco, came to this place with their loaded mules in the twilight, after sunset; being very anxious to get past it before night, they did not take the precaution to look out and call aloud before they entered on it, for there is a place built at each end of this dangerous piece of road, from whence one may see if there are others on it, not being quite half a mile in length; a person, in hallooing out, can be heard from one end to the other, and it is the practice of all who go this way to give this signal. A company of Moors had entered, at the other end, going towards Santa Cruz, at the same time, and they also supposing that no others would dare to pass it at that hour, came on without the usual precaution. When about half way over, and in the place the two parties met, there was no possibility of passing each other, or turning about to back either way; the Moors were mounted as well as the Jews, neither party could retire, nor could any one, except the foremost, get off his mule: the Moors soon became outrageous, and threatened to throw the Jews down headlong: the Jews, though they had always been treated like slaves, and forced to submit to every insult and indignity, yet finding themselves in this perilous situation, without the possibility of retiring, and unwilling to break their necks merely to accommodate the Moors, the foremost Jew dismounted, carefully, over the head of his mule, with a stout stick in his hand; the Moor nearest him did the same, and came forward to attack him with his scimitar: both were fighting for their lives, as neither could retreat; the Jew's mule was first pitched down the craggy steep, and dashed to atoms by the fall. The Jew's stick was next hacked to pieces by the scimitar; when, finding it was impossible for him to save his life, he seized the Moor in his arms, and, springing off the precipice, both were instantly hurled to destruction; two more of the Jews and one Moor lost their lives, in the same way, together with eight mules! and the three Jews, who made shift to escape, were hunted down and killed by the relations of the Moors who had lost their lives on the pass, and the place has, ever since, been called the Jew's Leap. It is, indeed, enough to produce dizziness, even in the head of a sailor, and if I had been told the story before getting on this frightful ridge, I am not certain but that my imagination might have disturbed my faculties, and rendered me incapable of proceeding with safety along this perilous path."

Riley's Narrative.

Figure of the Earth.

The inquiry into the figure and dimensions of the earth is of considerable astronomical use, and, if conducted to exactness, of very great difficulty. Here, however, it is intended to show, merely on popular grounds, and for probable reasons, the roundness of the earth, and then its magnitude, supposing it to be spherical.

The earth is probably round, from the phenomena which we may observe at sea. A ship first comes in sight by showing us the top of the masts; then, as it approaches, we see more and more of the masts, and at last the hull; and this phenomenon is also discernible, whatever be the quarter it appears in, whether it be north, south, east, or west.

The earth also is probably round, from the circumstance of navigators, who, by constantly leaving the port they departed from more and more behind them, have at last arrived at it. They must therefore have surrounded or *girded* the earth.

We may infer, also, the roundness of the earth from the seemingly circular boundary of its shadow on the face of the moon during a lunar eclipse; for if the earth be a sphere, its shadow will be conical, and a section perpendicular to the axis will be a circle.

These arguments tend to show that the earth is round; it certainly cannot be flat like a plane, nor concave like the inside of a bowl. But if round, why not spherical? This it was at first supposed to be, since, of round bodies, the sphere is the most simple. Observation, however, has proved this supposition to be erroneous; and, which is worthy of notice, the same body, the moon, that has been employed to show the roundness of the earth, has been employed to establish its non-sphericity. This will be subsequently shown.

The earth, however, although not exactly, is very nearly a sphere; and if we assume it to be such, its dimensions may be computed by the following method. By observations on the height of the polar star, or of the zenith distances of the same star, the latitudes of places may be determined. Suppose the difference of the latitudes of two places on the same meridian to be 1°; let the linear and actual distance of those places be measured; which will be found to be about 69½ miles; suppose it exactly such; then, since the earth's circumference, supposed to be circular, contains 360°, it will be equal to 360 + 69. 5, that is 25,020 miles, and its diameter will be about 7,960.

From this very method of determining the earth's magnitude, its deviation from perfect sphericity may be ascertained. If the earth were a sphere, then between two places on the same meridian, and differing in their latitude by 1°, the same linear distance of 69½ miles ought always to be found, at whatever distance from the equator the places were situated. This, however, is found not to be the case; between two places differing in latitude by 1°, in latitude about 66°, the linear distance is 122,457 yards. Between two places, near the equator, the linear distance is 121,027 yards, the former distance being 69½ miles + 137 yards, the latter 69½ miles — 1,293 yards; and similar measurements establish as a general fact, that degrees, that is, their linear values, increase as we move from the equator towards the pole.

But, if not spherical, what is the earth's form? It probably does not differ considerably from that of a spheroid. If we suppose it such, and from two degrees, the one measured at the equator, the other at the pole, determine the eccentricity of the eclipse that would generate it, will be found to be nearly 1-335, and the polar and equatorial diameters will be to one another as 335 to 336.

If the earth be not a sphere, the direction of gravity, which is no other than the direction of a plumb-line, will not generally, that is, in all latitudes, tend towards the earth's centre. If we measure a degree at the pole, the two plumb-lines that are inclined to each other at 1°, will meet in a point of the polar diameter beyond the centre; if at the equator, in a point of the equatorial diameter between the centre and the part of the equator where the measurement is made. In other situations, the directions of the plumb-lines will not meet in a diameter drawn to the point where the arc is measured.

Woodhouse.

Motion of the Earth Illustrated.

Let us imagine a prodigious large room, of a round form, all hung with pictures of men and women, birds, beasts, and fishes; the floor covered with water deep enough to carry a boat, with a person sitting still in it, and that there is a great taper burning in the midst of the room, the flame being of equal height with the person's head from the water. If a diver under the boat, unknown and unperceived by this person, should turn it gently and equally round and round, as an axis, giving it, at the same time, a slow progressive motion round the taper the same way, but so as to turn it three hundred and sixty-five times round its axis, while it went once round the taper; to the person in the boat, the whole room and taper would seem to go round the contrary way; every time the boat turned round, the flame would appear to change its place gradually among the pictures, so as to make a tour round the room among them in every revolution of the boat round the taper; and in that time the observer would be turned so much sooner towards any particular picture, than to the taper in each turning of the boat, that the whole room and pictures would seem to go once more round him than the taper did. The application is obvious, if we imagine the pictured room to represent the visible heaven set all round with stars, ranged in different constellations—the taper the sun, and the boat the earth.

Fergusson.

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Age of the World.

The principal arguments opposed to the authenticity of what Moses relates in regard to the history of the deluge, and the period when it took place, are drawn from the supposed antiquity of our continents, which is carried back without bounds, beyond that epoch. This opinion has its source in idea rather than in observation; for facts which have been carefully observed, show, on the contrary, that the continents we inhabit have no older date than that fixed by the chronology of Moses since the flood. For the proofs of this truth we refer to *Lettres Physiques et Morales sur l'Histoire de la Terre et de l'Homme*, and to those *sur l'Histoire Physique de la Terre*, or *Lettres Géologiques*, where are collected a great number of facts, the evidence of which cannot be contested.

But the project, long ago formed, of destroying the credit due to the revelation announced by the sacred historian, prevails, with some, over evidence. No attention is paid by infidels to the proofs which confirm it; and, without having been able to destroy them, and even without having tried it, they return to the charge as soon as an opportunity offers.

The *Moniteur*, or French *Official Gazette*, of the 14th February, 1802, contained a long article, in which are announced discoveries made in Upper Egypt, and among these is that of two zodiacs; from which it is "certain," says the writer, "that the present division of the zodiac, such as we are acquainted with, was established among the Egyptians *fifteen thousand years* before the Christian æra, and that it has been preserved without alteration, and transmitted to all other nations."

This conclusion, given with a tone of assurance, may easily impose, and make it be believed that it is well founded, though it can rest only on conjectures or mistakes in the application of astronomical calculations.

The Memoirs of the Academy of Sciences for 1708, contain an engraving of a large fragment of an Egyptian planisphere, or zodiac, which was sent from Rome to the academy. This zodiac, engraven on antique marble, was preserved in the Vatican. It represents concentric bands or circles divided into twelve equal portions by lines drawn from the circumference to the centre. The circle in the centre, which is not divided, contains three constellations, the Dragon and two Bears. The next circle, which is divided, contains the figures of animals, reptiles, and others. The two following circles contain each, in the same order, the twelve signs of the zodiac, some of which are in good preservation. The fifth circle, separated by a band on which are traced out letters or characters, contains in each division, corresponding to a sign, three human figures, some of which have the head of an animal. And the last circle, which incloses the whole, represents the planets repeated under the figure of human heads, corresponding to certain divisions of the signs, according as the imagination, inclined to the chimeras of astrology, suggested.

The learned in 1708 were far from assigning to this zodiac a high antiquity: it was even considered, and with justice, as being rather astrological than astronomical; and, therefore, it was left in the historical part of that year as a mere object of curiosity, not worthy of engaging the time of the academy.

But Voltaire and his school had not yet appeared *seated in the scorner's chair*, throwing out their sophisms and their sarcasms against the account given by Moses. These sarcasms made their usual impression on inattentive men. They reject as fabulous the chronology of the sacred historian; and, by a very remarkable but not novel inconsistency, they give more faith to the uncertain interpretations of these combined arrangements of the Egyptian signs and hieroglyphics, the date of which, as well as the meaning, is unknown, than to a chronology established on an uninterrupted series of generations.

Fortunately, without going far from the place where these zodiacs were found, a very remarkable fact of the philosophy of the earth bears testimony against the antiquity ascribed to them.

We know, from the accounts of enlightened travellers, that the coast of Arabia on the Red Sea is incumbered with banks or reefs of coral, which render access to them difficult and dangerous.

These reefs are the work and habitation of polypi, which, in proportion as they labour, abandon their first habitations, on which they continue to build. This succession of labour is seen very distinctly in those marine productions which serve to ornament our cabinets of natural history under the names of coral, madrepores, millepores, sea organs, &c.

In warm climates, these polypi are always in activity; they never cease to multiply and to labour; the result of which is, that in a short time they augment in a sensible manner the mass of their habitations, which are not destroyed by age, as they are of the same substance as shells, and have the same hardness.

Niebuhr, in his Description of Arabia, p. 199, mentions a striking instance of the rapid increase of these coral banks, observed at the distance of some leagues to the north of Mokha. "Ghaleska, a town formerly celebrated," says he, "is at present a wretched village, the inhabitants of which, few in number, live on their dates, and by fishing. The coast is at present so filled with coral banks, that the port is impracticable even to small vessels."

If only a few centuries then were required to render a port and the neighbouring coasts impracticable, this rigorous consequence results, that all these shores must, many ages ago, have been inaccessible to ships, had the Red Sea and the coast by which it is bordered, existed fifteen thousand years before the Christian æra, as is said, of the zodiacs of Upper Egypt, which would still suppose many thousands of years anterior to that period.

And when we reflect that as we are no longer stopped in regard to the antiquity of our continents by any known chronology, the result is, that they may have existed millions as well as thousands of years: there are no more bounds, then, assignable to their antiquity, and consequently to the progress of the labour of these insects; and the Red Sea, narrow and deep, ought to have been totally choked up by it.

But the Red Sea is not the only one which exhibits these coral reefs, and their continual increase: a great number of isles situated between the tropics are surrounded by them in such a manner as renders access to them as difficult as on the coasts of Arabia.

Mr. Labillardière, the author of *Voyage à la Recherche de la Perouse*, makes on this subject the following reflection, in consequence of the vessels having been exposed to great danger among such reefs, which extend around New Caledonia: — "These polypiers," says he, "the continual increase of which blocks up more and more the bason of the seas, are very capable of frightening navigators; and many shoals, which still afford a passage, will soon form reefs exceedingly dangerous."

If the present state of the seas and continents had existed for thousands of ages, as pretended by those geologists who reject the chronology of Moses, is it not evident that these reefs, which continually increase, would have long ago surrounded these islands with so great a number of these walls of coral, that it would have been impossible for the first navigators to approach even within a considerable distance of them? Nature, then, agrees here with the chronology of the sacred Scriptures. The labour of these little animals rises up from the bottom of the sea, in testimony of the truth of their relation.

These coral rocks appear to be a production peculiar to the present sea; for we find nothing similar in calcareous mountains, nor in hills consisting of shells. Coral and madrepores are, no doubt, found in them; but they are insulated in the strata like all other marine bodies. This example shows how deceitful the calculations of geology may be, when applied to facts in the philosophy of the earth without consulting nature.

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The Shark and Pilot Fish.

It has been asserted that the sharks have subject to their empire a very small fish of the species of the *gadus;* that the latter precedes his master during his voyages, points out to him those places of the sea most abundant in fish, discovers to him the traces of the prey he is fondest of; and that, out of gratitude for such signal services, the shark, notwithstanding his voracity, lives in good intelligence with a companion so useful to him. Naturalists, always on their guard against the exaggerations of travellers, have doubted the truth of these facts. If we may credit, however, the following statement of Professor Geoffroy, published in the *Bulletin des Sciences,* no doubt can remain of the existence of this singular association.

"In the month of May 1798," says M. Geoffroy, "I was on board the Alceste frigate between Cape Bon and the island of Malta. The sea was tranquil, and the passengers were much fatigued with the long duration of the calm, when their attention was attracted by a shark which they saw advancing towards the vessel. It was preceded by its pilots, which kept at a pretty regular distance from each other, and from the shark. The two pilots directed their course towards the poop of the vessel, inspected it twice from one end to the other, and, after having satisfied themselves that there was nothing which they could turn to their advantage, resumed their former route. During the various movements which they made, the shark never lost sight of them, or rather followed them as exactly as if he had been dragged by them.

" He had no sooner been descried, than one of the sailors got ready a large hook, which he baited with lard; but the shark and his companions had already proceeded to the distance of 20 or 25 millimetres before the sailor had made all his preparations: he, however, threw the piece of lard into the sea at a venture. The noise occasioned by its fall was heard at a considerable distance. The travellers were astonished, and stopped. The two pilots then detached themselves, and went to explore at the poop of the vessel. The shark, during their absence, sported in a thousand ways at the surface of the water; turned himself on his back, then on his belly, and dived to a greater depth, but always re-appeared at the same place. When the two pilots came to the poop of the Alceste they passed close to the lard, and no sooner observed it, than they returned to the shark with a greater velocity than they advanced to it. When they reached it, the latter continued his course. The pilots then swimming one on his right and the other on his left, made every effort to get before him. Scarcely had they done so when they suddenly returned, and then went back a second time to the poop of the vessel. They were followed by the shark, who was enabled by the sagacity of his companions to perceive the prey destined for him. It has been said that the shark is endowed with a very delicate sense of smelling. I paid a great deal of attention to what took place on his approaching the lard. It appeared to me that he did not discover it till the moment it was pointed out to him by his guides; it was then only that he began to swim with greater velocity, or rather made a jump to seize it. He detached a portion of it without being hooked; but at the second attempt the hook penetrated the left lip, by which means he was hoisted on board.

"It was not till the end of two hours, during which I was employed in anatomizing the shark, that I began to regret I had not observed more accurately the species which had devoted themselves so readily to the service of this voracious fish. I was assured that some of them might be easily procured, as it was certain they had not quitted the neighbourhood of the vessel; and a few moments after, I was presented with an individual, which I found to belong to the pilot or *sanfre des marins*, and the *gasterosteus ductor* of the naturalists."

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Stone Barometer.

A Finland newspaper mentions a stone in the northern part of Finland, which serves the inhabitants instead of a barometer. This stone, which they call Ilmakiur, turns black, or blackish grey, when it is going to rain, but on the approach of fine weather it is covered with white spots. Probably it is a fossil mixed with clay, and consisting of rock-salt, ammoniac, or saltpetre, which, according to the greater or less degree of dampness of the atmosphere, attracts it, or otherwise. In the latter case, the salt appears, which forms the white spots.

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Highest Relative Strength of Materials.

METALS.

	Force of a square inch in lbs. avoirdupoise.
Steel, razor temper	150,000
Iron wire	113,077
Copper ditto	61,228
Platinum ditto	56,473
Silver ditto	38,257

	Force of a square inch, in lbs. avoirdupoise.
Gold ditto	30,888
Tin ditto	7,129
Lead ditto	3,146
Antimony (cast)	1,060
WOODS.	
Lance wood	24,696
Locust tree	20,582
Ash (Frasinus)	18,915
Oak	17,820
Beech	17,709
Arbutus	17,379
Teak	14,220
Alder	14,186
Mulberry	14,054
Elm	13,489
Pitch Pine	13,176
Fir	13,006
Larch	11,093
Plum	12,782
Willow	12,782
Mahogany	12,186
Chesnut (100 years in use)	12,168
Maple	10,584
Poplar	6,641
Cedar	4,973
MISCELLANEOUS SUBSTANCES.	
Hemp fibres, glued together	92,000
Paper strips, glued together	30,000
Ivory	16,626
Slate (Welsh)	12,800
Plate glass	9,420
Marble (white)	9,000
Horn of an ox	7,667
Portland stone	784
Brick	300
Plaster of Paris	72
Mortar of sand and lime, sixteen years made	50

Invention of Printing.

GUTTEMBERG (called John Gensfleish of Sulgeloch), the inventor of printing in Europe, was born at Mentz, in 1400. Only two cities now dispute the honour of having given birth to the typographic art, and both boast of having produced the same artist. Though there is not extant any monument of the art of printing, to which the name of Guttemberg is affixed, yet a well-authenticated tradition, adopted by the two cities, incontestibly bears witness in favour of the individual in question.

The family of Guttemberg was noble, and possessed two houses; the one called *Zum Gensfleish* (House of Goose-flesh), the other, *Zum Gudenberg* (House of Good Mountain.) In 1424, Guttemberg proceeded to Strasburg, where, in 1436, he formed a co-partnership with Andrew Dryzehn and some others, *in all his marvellous arts and secrets.* George Dryzehn, on the death of his brother Andrew, insisted on becoming his successor; and, in 1339, instituted a law-suit against Guttemberg, who was condemned to resign to the heirs of the deceased the share he had held in the partnership. The invention of typography was, it appears, among the number of the *marvellous secrets*, which brought about the co-partnership. It may therefore be presumed, that the art of printing had its birth in the city of Strasburg, in the year 1436. But we know nothing respecting the early processes and first productions of the art. It is generally believed, that up to the year 1438, Guttemberg made use of moveable wooden characters. But either the derangement of his affairs, or the fear of injuring his credit, prevented him at all times from putting his name to his works; and we are here reduced to mere conjectures. One thing is, however, certain; namely, that Guttemberg was an inhabitant of Strasburg in 1444: but in 1443, he had hired a house at Mentz, where, in 1450, he formed a connection with Faustus. To this partnership is generally attributed the production of the *Biblia Latina*, called the forty-two line Bible, without either date, name of the printer, or the place at which it was printed. This work was, however, the occasion of law-suits between the two partners. Faustus demanded a reimbursement of the considerable sums which he had advanced, and, in 1455, Guttemberg was compelled to resign the establishment to Faustus, who carried it on in company with Schoiffer. In the year following, Guttemberg, assisted by Conrad Humery, a Syndic of Mentz, established another press in that city. From this press, doubtless, issued the work entitled, *Hermanni de Saldis speculum sacerdotum*, sixteen sheets quarto; neither date nor printer's name is attached to it, though it bears the name of the city of Mentz; it is printed in characters different from those which belonged to the other presses of Mentz. Such is the opinion of M. Von Prael concerning this volume, and it may safely be adopted.

M. G. Fischer, who published an *Essay on the typographic monuments of J. Guttemberg*, attributed to Guttemberg the printing of ten works, among which are four editions of the Donat. But since the publication of M. Fischer's work, a sheet belonging to one of these Donats has been discovered, which bears the name of *Peter of Gernsheim* (Schoiffer); a circumstance which authorises us in attributing to this same Schoiffer, all the works which are executed with corresponding characters. But these characters, which are the same as those of the *Biblia Latina*, having first belonged to Guttemberg and Faustus, and afterwards to Faustus and Schoiffer, it is extremely difficult to allot to each their share of the impressions. It is remarkable, that the names of the inventors of the two most celebrated discoveries of the fifteenth century, are not attached to their productions. The Psalter of 1457, of which the priority of date is indisputable, bears only the names of Faustus and Schoiffer, though it cannot possibly have been the first production of the art. During the four last centuries, printing characters have received a more elegant form (perhaps one which is less agreeable to the eye); but in every other respect, the Psalter of 1457 is doubtless a masterpiece. It must have been preceded by long experiments; and here the efforts of Guttemberg cannot be disputed. There is reason to believe, that in the infancy of the art, more than eighteen months must have been spent in the printing of this Psalter, an interval which carries us back to a period previous to the separation of Guttemberg and Faustus.

Palmer, in his History of Printing, (in English) mentions a book entitled, *Liber Dialogorum Gregorii*, the subscription of which he gives in the following terms: "*Presens hoc opq (opus) factum est per Johan. Guttenbergium apud argentinam anno millesimo cccclviii.*" David Clement, on the authority of Palmer, mentions this volume in the preface to his *curious Bible*, page 16; and again in vol. iv. page 70; and vol. ix. pages 275 and 276. In the latter instance, he, however, acknowledges having too readily placed faith in Palmer, and regards the subscription which he quotes as a *matter of doubt*. This subscription is now known to have been printed after the work, and is said to have been done at Oxford. In 1458, Guttemberg established his second printing press at Mentz, where he continued to print until 1465, when he was appointed Gentleman of the Household to the Elector Adolphus of Nassau. He died three years afterwards, on the 24th of February, 1468.

Origin of Pamphlets.

"I look upon Pamphlets," says a writer of the 17th century, "as the eldest offspring of paper, and entitled to claim the rights of primogenitorship even of bound volumes, however they may be shorter lived, and the younger brother has so much outgrown the elder. Being of a more facile, decent, and simple form, suitable to the character of the more artless ages, they seem to have been preferred by our modest ancestors for the communication of their sentiments, before book-writing became a trade, and lucre and vanity let in deluges of digressory learning to swell up unwieldy folios. Thus I find, not a little to the honour of our subject, no less a person than the renowned Alfred collecting his sage precepts and divine sentences, with his own royal hand, into *quaternions* of leaves stitched together, which he would enlarge with additional quaternions, as occasion offered; yet seemed he to keep his collection so much within the limits of a pamphlet size, however bound together at last, that he called it by the name of his "Hand-book;"—because he made it his constant companion, and had it at hand wherever he went.

"It was, however, the grand controversy between the Church of Rome and the first opposers thereof, which seems to have lain the foundation of this kind of writing, and to have given great credit to it at the same time, as well by the many eminent authors it produced in church and state, as the successful detection and defeat thereby befalling those religious impostures which had so universally enslaved the minds of men. Nay, this important reformation has been much ascribed to one little pamphlet only, which a certain lawyer of Gray's Inn, (obliged to fly into Germany for having acted in a play which incensed Cardinal Wolsey) composed there, and conveyed by means of Lady Anne Boleyn to the perusal of Henry VIII. at the beginning of this rupture; the copies whereof were strewed about at the king's procession to Westminster; the first example, as some think, of that kind of appeal to the public. How the Cardinal was nettled thereat; how he endeavoured to stifle and secrete the same; how it provoked the pen of the bigotted Lord Chancellor (Sir Thomas More); and yet how it captivated the said king's affection and esteem, may not only be presumed from the purport, but gathered from the accounts which our ecclesiastical histories have given thereof. It would be endless to specify how much this province was henceforward cultivated by prelates, statesmen, and authors of the first rank, not excepting majesty itself, in the several examples which might be produced of the said Henry VIII., King James, and Charles."

England, from the spirit of liberty which prevails in it, has, of all countries, been the most fruitful in pamphlets; and the period of its history when they most abounded, is that when the greatest attempts were made to crush that spirit. "From the grand collection of pamphlets," says the same writer, "which was made by Tomlinson, the bookseller, from the latter end of the year 1640 to the beginning of 1660, it appears there were published in that space, nearly thirty thousand several Tracts; and that these were not the complete issue of that period, there is good presumption, and, I believe, proofs in being. Notwithstanding it is enriched with near a hundred manuscripts, which nobody then (being written on the side of the royalists) would venture to put into print; the whole, however, is progressionally and uniformly bound in upwards of two thousand volumes, of all sizes. The catalogue, which was taken by Marmaduke Foster, the auctioneer, consists of twelve volumes in folio; wherein every piece has such a punctual register and reference, that the smallest, even of a single leaf, may be readily repaired to thereby. They were collected no doubt with great assiduity and expence, and not preserved, in those troublesome times, without great danger and difficulty; the books being often shifted from place to place, out of the army's reach. So scarce were many of the pamphlets, even at their publication, that Charles I. is reported to have given ten pounds for only reading one over (which he could no where else procure) at the owner's house in St. Paul's Church-yard."

The writer proceeds to remark on the great price given for pamphlets which were become scarce. "There never was a greater esteem, or better market; never so many eager searches after, or extravagant purchasers of, scarce pamphlets, than in the present times, which have been made evident either from the sales of them in general; as that of Tom Britton, the celebrated small-coal man of Clerkenwell, who, besides his chemical and musical collections, had one of choice pamphlets, which he sold to the late Lord Somers, for upwards of £500; and more especially Mr. Anthony Collins, the last year, whose library, consisting principally of pamphlets, and those mostly controversial, and mostly modern, is reported to have sold both parts of it for £1800; or whether we descend into particulars, and consider the exorbitant value set upon some single pieces, as the topographical pamphlets of John Norden, the surveyor, which, before they were reprinted, often sold for forty shillings a-piece; the Examination of Sir John Oldcastle, which I have known sold for three guineas, though gleaned from Fox's Book of Martyrs; the Expedition of the Duke of Somerset into Scotland also has been sold for four guineas, though totally inserted in Hollinshed."

Double Entendre.

Copy of a letter written by Cardinal Richelieu to the French ambassador, at Rome.

Sir,—M. Compigne, a Savoyard by birth,
is the man who will present to you
this letter. He is one of the most
meddling persons that I have ever known
He has long earnestly solicited me
to give him a suitable character,
which I have accordingly granted to
his importunity; for, believe me, Sir,
I should be sorry that you should be
misinformed of his real character;
as some other gentlemen have been,
and those among the best of my friends:
I think it my duty to advertise you
to have special attention to all he does,
nor venture to say any thing before him,
in any sort; for I may truly say, there is
none whom I should more regret to see
received and trusted in decent society.
And I well know, that as soon as you
shall become acquainted with him
you will thank me for this my advice.
Courtesy obliges me to desist from
saying anything more on this subject.

a Friar of the order of Saint Benedict,
as his passport to your protection,
discreet, the wisest, and the least
or have had the pleasure to converse with.
to write to you in his favour, and
together with a letter of credence;
his real merit, rather, I must say, than to
his modesty is only exceeded by his worth.
wanting in serving him on account of being
I should be afflicted if you were
misled on that score, who now esteem him,
wherefore, and from no other motive
that you are most particularly desired,
to shew him all the respect imaginable,
that may either offend or displease him
no man I love so much as M. Compigne,
neglected, as no one can be more worthy to be
Base, therefore, would it be to injure him.
are made sensible of his virtues, and
you will love him as I do; and then
The assurance I entertain of your
urging this matter to you further, or

Believe me, sir, &c.

Richelieu.

First read the letter across, then double it in the middle, and read the first column.

Cannon.

In 1545, it was remarked, as extraordinary, that the French and English fleets had fired not less than 300 cannon shot, in an engagement of two hours! It is therefore evident, that few cannon were carried by any one ship: and indeed, we believe, that originally the number was only *two*, placed in a castle in the forepart of the ship; whence the name of "forecastle" is still retained, though the guns are removed. These guns also were of small dimensions; and probably, at first *fixed*, to prevent their recoil; as we know they were, on land. When the accidents to which their aim was liable, in consequence of the motion of the ship, &c. are considered, we may safely infer that the slaughter they produced could not be very great. The ordnance was afterwards augmented in number, by the admission of pieces of various descriptions and calibres; which stood without assortment on the same deck.

Expert Workmanship.

James Leighton, a nail-smith, in the employ of Mr. Thomas Gillies, ironmonger in Stirling, undertook, for a trifling bet, to make 17,030 double flooring, 1200 to a thousand of 20lbs. for two successive weeks, a task which must, to all who have any knowledge of the trade, seem scarcely credible. The workman finished his first week's task by three o'clock on Saturday afternoon, resumed his labour on Monday morning, and concluded his second week's task with even more ease than he did the first. Those who do not understand the nature of the work, may form some idea of the undertaking, when they are informed, that the above quantity is allowed to be as much as three ordinary men can perform without difficulty, and that, allowing 25 strokes of the hammer, (which is 2lbs. weight), to each nail, including the cutting of the rods into a size convenient to be handled, and reuniting them when too short, there were no less than 1,033,656 strokes required before the task could be completed. In addition to this, the workman had to give from one to three blasts with his bellows for every nail he made—had to supply his fire with fuel—and had to move from the fire place to where the nails where made, and *vice versa*, upwards of 42,836 times. The workman entered into his fifty-first year on the day on which he commenced his task—had been upwards of 42 years a nailer, and in 1800, when in Ireland, in his Majesty's service, beat one who was reckoned the best workman in that country, by 775 nails, during twelve hours' work.

* * *

Palpable Arithmetic.

In the schools of ancient Greece, the boys acquired the elements of knowledge by working, on a smooth board with a narrow rim, the *Abax*, so named evidently from a combination of A, B, Γ, the first letters of the alphabet; resembling, except perhaps in size, the tablet likewise called A, B, C, on which children with us used to begin to learn the art of reading. The pupils in the distant ages were instructed to compute, by forming progressive rows of counters, which, according to the wealth or fancy of the individual, consisted of small pebbles, of round bits of bone or ivory, or even of silver coins. The same board served also for teaching the rudiments of writing, and the principles of geometry. The *Abax* being strewed with green sand, the *pulvis eruditus* of classic authors, it was easy with a radius or small rod to trace letters, draw lines, construct triangles, or describe circles.

To their calculating board the ancient Greek authors make frequent allusions. It appears from the relation of Diogenes Laertius, that the practice of bestowing on pebbles an artificial value, according to the rank or place which they occupied, remounts higher than the age of Solon, the great reformer and legislator of the Athenian commonwealth. Eschines, in his oration for the crown, speaking of balanced accounts, says that the *pebbles* were *cleared away and none left*. His rival, Demosthenes, repeating this expression, speaks farther of *taking up as many counters as were laid down*. It is evident, therefore, that the ancients, in keeping their accounts, did not separately draw together the credits and debts, but set down pebbles for the former, and took up pebbles for the latter. As soon as the board became cleared, the opposite claims were exactly balanced. We may observe, that the phrase *to clear one's scores or accounts*, meaning to settle or adjust them, is still preserved in the popular language of Europe, being suggested by the same practice of reckoning with counters, which prevailed, indeed, until a comparatively late period.

The Romans borrowed the *Abacus* from the Greeks, and never aspired higher in the pursuit of science. To each pebble or counter required for that board, they gave the name of *calculus*, a diminitive formed from *calx*, a stone; and applied the verb *calculare*, to signify the operation of combining or separating such pebbles or counters. The use of the *Abacus*, called sometimes likewise the *Mensa Pythagorica*, formed an essential part of the education of every noble Roman youth:

> Nec qui abaco numeros; et secto in pulvere metas
> Scit risisse vafer. *Pers. Sat.* I. 132.

From Martianus Capella, we learn, that as refinement advanced, a coloured sand, generally of a greenish hue, was employed to strew the surface of the *abacus*. A small box or coffer, called *loculus*, having compartments for holding the *calculi* or counters, was a necessary appendage. Instead of carrying a slate and satchel, as in modern times, the Roman boy was accustomed to trudge to school, loaded with his arithmetical board, and his box of counters.

To facilitate the working by counters, the construction of the *abacus* was afterwards improved. Instead of perpendicular lines or bars, the board had its surface divided by sets of parallel grooves, by stretched wires, or even by successive rows of holes. It was easy to move small counters in the grooves, to slide perforated beads along the wires, or to stick large knobs or round-headed nails in the different holes. To diminish the number of marks required, every column was surmounted by a shorter one, wherein each counter had the same value as five of the ordinary kind, being half the index of the denary scale. The abacus, instead of wood, was often, for the sake of convenience and durability, made of metal, frequently brass, and sometimes silver. In Plate XIII. we have copied from the third volume of Polenus's Supplement to the Thesaurus of Grævius, two varieties of this instrument, as used by the Romans. In the one, the numbers are represented by flattish perforated beads, ranged on parallel wires; and in the other, they are signified by small round counters, moving in parallel grooves. These instruments contain each seven capital bars, expressing in order, *units, tens, hundreds, thousands, hundred thousands,* and *millions;* and above them are shorter bars following the same progression, but having four times the regular value. With four beads on each of the long wires, and one bead on every corresponding short wire, it is evident that any number could be expressed, as far as ten millions.

In all these, the denary scale is followed uniformly, but there is besides a small appendage to the arrangement founded on the duodenary system. Immediately below the place of units is added a bar with its corresponding branch, both marked with a *theta,* by being designed to signify ounces or the twelfth parts of a pound. *Five* beads on the long wire, and one bead on the short wire, equivalent now to six, would therefore denote *eleven* ounces. To express the simpler fractions of an ounce, three very short bars are annexed behind the rest; a bead on the one marked S, the contraction for *semissis,* denoting half an ounce; a bead on the other which is marked by the inverted ↄ, the contraction for *sicilicum,* signifying the quarter of an ounce; and a bead on the last very short bar, marked with a contraction for binæ *sextulæ,* intimating a duella or two-sixths, that is, the third part of an ounce. The second form of the *abacus* differs in no essential respect from the first; the grooves only supplying the place of parallel wires.

The Chinese have, from the remotest ages, used in all their calculations an instrument called the *swan-pan*, a *computing table* similar in its shape and construction to the *abacus* of the Romans, but more complete and uniform. It consists of a small oblong board surrounded by a high ledge, and parted lengthwise near the top by another ledge; it is then divided vertically, by ten smooth and slender rods of bamboo, on which are strung two small balls of ivory or bone in the upper compartment; each of the latter on the several bars denoting unit, and each of the former, for the sake of abbreviation, expressing five. See Plate XIII. where the balls are set to signify the numbers subjoined.

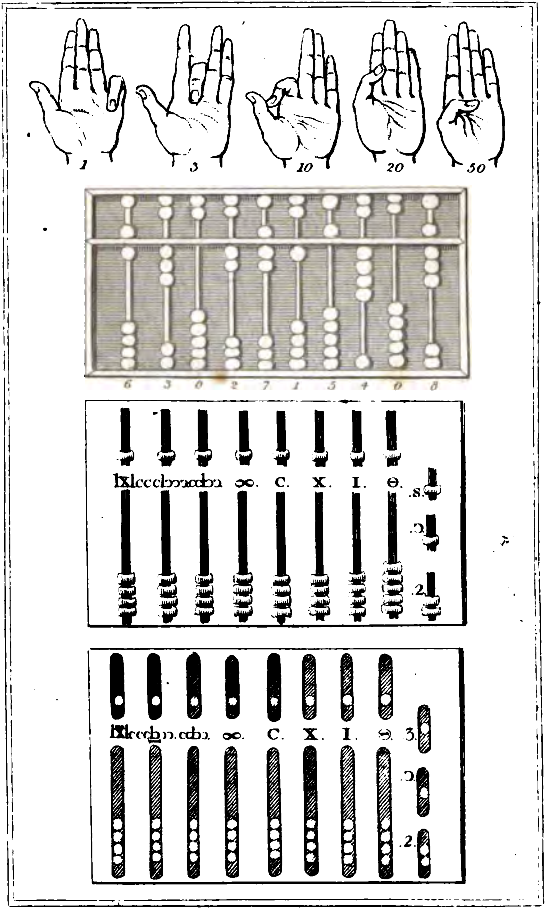
The system of measures, weights, and coins which prevails throughout the Chinese empire, being entirely founded on the decimal subdivision, the swan-pan was admirably suited for representing it. The calculator could begin at any particular bar, and reckon with the same facility either upwards or downwards. The advantage of treating fractions as integers, was, in practice, of the utmost consequence. Accordingly, these arithmetical machines but of very different sizes, are constantly used in all the shops and booths of Canton and other cities, and are said to be handled by the native traders with such rapidity and address as quite astonish the European factors.

The *abacus*, with its store of counters, wanted the valuable property of being portable, and was at all times evidently a clumsy and most incommodious implement of calculation. In many cases it became quite indispensable to adopt some sure and ready method of expressing at least the lower numbers. The Greeks employed the variously combined inflexions of the fingers on both hands to signify the numerical series, and on this narrow basis they framed a system of considerable extent. In allusion to the very ancient practice of numbering by the arbitrary play of the fingers, Orontes, the son-in-law of Artaxerxes, having incurred the weighty displeasure of that monarch, is reported by Plutarch to have exclaimed in terms exactly of the same import as those before ascribed to Solon, that "the favorites of kings resemble the fingers of the arithmetician, being sometimes at the top and sometimes at the bottom of the scale, and are equivalent at one time to ten thousand, and at another to mere units."

Among the Romans, likewise, the allusions to the mode of expressing numbers by the varied inflexion of the fingers are very frequent. Hence the classical expressions *computare digitis* and *numerare per digitos*. In this play of the fingers great dexterity was acquired; and hence the phrase which so frequently occurs in the classics,—*micare digitis*. It was customary to begin with the left hand, and thence proceed to the right hand, on which the different combined inflections indicated exactly one hundred times more. Many allusions to this mode of indicating numbers occur in the writings of Cicero, Quintilian, and Juvenal. The ancients, indeed, for want of better instruments, were tempted to push this curious art to a very great extent. By a single inflection of the fingers of the left hand, they proceeded as far as ten, and, by combining another inflection with it, they could advance to a hundred. The same signs on the right hand being augmented, as we have seen, an hundred fold, carried them as far as ten thousand; and, by a farther combination, these signs, being referred successively to different parts of the body, were again multiplied a hundred times, and therefore extended to a million. This kind of pantomime outlived the subversion of the Roman empire, and was particularly fitted for the slothful religious orders who fattened on its ruins, and, relinquishing every manly pursuit, recommended silence as a virtue, or enjoined it as an obligation. The venerable Bede has explained the practice of manual numeration at some length, and in Plate XII. we have given a small specimen of such inflexions and digital signs.

The Chinese have also contrived a very neat and simple kind of digital signs, for denoting numbers, greatly superior both in precision and extent to the method practised by the Romans. Since every finger has three joints, let the thumb nail of the other hand touch those joints in succession, passing up the one side of the finger, down the middle and

Plate XIII to face p. 188.


1
3
10
20
50
6 3 0 2 7 1 5 4 0 8
lXlccclↃↃↃcclↃↃ ∞. C. X. I. Θ. .S. .Ↄ. .2.
lXlcclↃↃ.cclↃↃ. ∞. C. X. I. Θ. 3. .Ↄ. .2.

PALPABLE ARITHMETIC.

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again up the other side, and it will give nine different marks, applicable to the denary scale of arrangement. On the little finger these marks signify units, on the next finger tens, on the mid finger thousands, on the index thousands, and on the thumb hundred thousands. With the combined portions of the joints of the one hand, therefore, it is easy to advance by signs as far as a million.

* * *

Quantity and Value.

WHEN emeralds were first discovered in America, a Spaniard carried one to a lapidary in Italy, and asked him what it was worth; he was told a hundred *escudos;* he produced a second, which was larger, and that was valued at three hundred. Overjoyed at this, he took the lapidary to his lodging, and shewed him a chest full; but the Italian, seeing so many, damped his joy by saying, "Ah! ha! Senor, so many!—these are worth *one* escudo."

* * *

Cats.

THE first couple of cats, which were carried to Cuyaba, sold for a pound of gold. There was a plague of rats in the settlement, and they were purchased as a speculation, which proved an excellent one. Their first kittens produced thirty *oitavas* each; the next generation were worth twenty; and the price gradually fell, as the inhabitants were stocked with these beautiful and useful creatures.

Montenegro presented to the elder Almagro the first cat which was brought to South America, and was rewarded for it with six hundred pesos.

Southey's Brazil.

* * *

The Chesnut-Tree.

CHESNUTS grow wild in this country, but never equal those in size and perfection which are imported from Spain and Italy. In these countries they sometimes grow to an immense size, and the largest in the known world are those growing upon Mount Etna in Sicily. The most bulky of them is known by the name of *the chesnut-tree for a hundred horses;* and is one hundred and sixty feet in circumference, but quite hollow within. The people have built a house in the cavity of this enormous mass. At Tortworth in Gloucestershire, there is a chesnut tree, fifty-two feet in circumference, which is probably nearly one thousand years old.

⁂

Methods of ascertaining Currents at Sea.

THE currents at sea are not sensible but at a small distance from the surface of the water. This fact, which is well known to navigators, supplies them with the means of determining whether their vessel be in a current. They hoist out a boat, which proceeds to some distance from the vessel, and then let down a weight attached to a rope to the depth of 200 fathoms. This weight being thus at a great depth in calm water, observation and experience having shewn that currents are not sensible beyond the depth of ten fathoms, it produces the effect of an anchor which retains the boat: they then throw into the water a very thin board, that the wind may have no hold of it, and according to the motion of this board, if it has any, they discover whether there be a current, and determine its direction and velocity. It results from these facts, that the libration of the sea, occasioned by the moon, which produces the tides, is owing to its extent, and in no manner to its depth.

⁂

Japanese Mode of Reckoning Time.

THE Japanese division of time is extremely singular. When Captain Golownin visited them in 1812, their new year commenced in February. "As they reckon," he says, "by lunar years, but supply the difference between the lunar and solar reckoning, by adding a thirteenth month to each year of the proper number for that intercalation, then new year's-day corresponds every nineteenth year with the solar new year.

"The Japanese," continues Captain G, "occupy an entire month in celebrating the new year; though the period of the festival, strictly speaking, is only from the new to the full moon, or a fortnight. During this period the courts are closed; all labour and business suspended, and nothing except visiting and feasting is thought of; but in the remaining half of the month the more industrious resume their occupations. The new year is the principal festival in the calendar of the Japanese. They, therefore, make extraordinary preparations at its approach, and procure new clothes for it, as we do at Easter. Custom requires that each person should visit all his acquaintances in the place in which he resides, and send letters of congratulation to those who are at a distance.

"The Japanese divide the day into twelve hours, reckoning six from sun-rise to sun-set; consequently the hours are not always equal: when the day is longer than the night, the day hours are the longest; and when the night is longer than the day, the night hours are longest. To measure time, they employ a small beam of wood, the upper part of which is covered with glue, and whitewashed; a narrow groove is made in the glue, and filled with a vegetable powder, which burns very slowly; on each side of this groove, at certain distances, there are holes bored for the purpose of nails being put into them. By these holes the length of the day and night hours is determined for the space of six months, from the spring to the winter equinox. During the other six months, the rule is inverted, the day becoming night hours, and the night day hours. The Japanese ascertain the length of a day hour, and mark it off with nails; they then fill the groove with powder, set light to it at noon, and thus measure their time. The beam is kept in a box, which is laid in a dry place; but the changes of the weather have, notwithstanding, a great influence on this kind of time-keeper.

"The Japanese day begins at midnight, at which time the clock strikes *nine*, after having given three strokes, as it were, to denote the being about to strike. These three strokes precede every hour. One hour after midnight, the clock strikes *eight*, the next hour *seven*, at sunrise *six*, then *five* and *four*, and at noon again *nine*. One hour after midday *eight*, two hours after mid-day *seven*, at sunset *six*, then *five*, and finally *four*. At midnight the new day commences. The hours are struck in the following manner: first, one stroke; in a minute and a half, a second stroke; and immediately a third. These three warning strokes announce that the hour is about to be struck. In the space of a minute and a half after, the striking of the hour begins. The strokes succeed each other at the intervals of fifteen seconds, except the two last, which follow more rapidly, as if to notify that the hour is struck."

THE END.

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